HABERLEA RHODOPENSIS.

CAMPANULA TURBINATA.

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A PRACTICAL AND SCIENTIFIC

Encyclopædia of Horticulture

FOR

GARDENERS AND BOTANISTS.

MISSOURI
BOTANICAL
GARDEN.

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REFERENCE TO ILLUSTRATIONS OF PLANTS OTHER THAN THOSE FIGURED IN THIS WORK.

IT has been suggested, by an eminent Authority, that many readers would be glad to be informed where reliable Illustrations could be found of those Plants which are not figured in this Work. To meet this want, references to the figures in Standard Authorities have been given, the titles of the Works referred to being, for economy of space, abbreviated as follows:

A. B. R. ..	Andrews (H. C.). Botanist's Repository. London, 1799-1811. 10 vols. 4to.
A. E.	Andrews (H. C.). Coloured Engravings of Heaths. London, 1802-30. 4 vols. 4to.
A. F B. ..	Loudon (J. C.). Arboretum et Fruticetum britannicum. London, 1838. 8 vols. 8vo.
A. F. P	Allioni (C.). Flora pedemontana. Aug. Taur., 1785. 3 vols. Fol.
A. G.	Aublet (J. B. C. F.). Histoire des Plantes de la Guiane française. Londres, 1775. 4 vols. 4to.
A. H.	Andrews (H. C.). The Heathery. London, 1804-12. 4 vols. 4to.
B.	Maund (B.). The Botanist. London, 1839. 8 vols. 4to.
B. F. F. ..	Brandis (D.). Forest Flora of . . . India. London, 1876, 8vo. Atlas 4to.
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B. H.	La Belgique Horticole. Ghent, 1850, &c. 8vo.*
B. M.	Botanical Magazine. London, 1787, &c. 8vo.*
B. M. Pl. ..	Bentley (R.) and Trimen (H.). Medicinal Plants. London, 1875-80. 8vo.
B. O.	Bateman (James). A Monograph of Odontoglossum. London, 1874. Fol.
B. R.	Botanical Register. London, 1815-47. 33 vols. 8vo.
B. Z.	Botanische Zeitung. Berlin, vols. i.—xiii. (1843-55). 8vo. Leipzig, vol. xiv. (1856).*
C. H. P. ..	Cathcart's Illustrations of Himalayan Plants. London, 1855. Fol.
Enc. T. & S.	Loudon (J. C.). Encyclopædia of Trees and Shrubs. London, 1842. 8vo.
E. T. S. M. ..	*See* T. S. M.
F. A. O. ..	Fitzgerald (R. D.). Australian Orchids. Sydney, 1876. Fol.*
F. D.	Flora Danica—usually quoted as the title of the work, Icones plantarum . . . Daniæ et Norvegiæ. Havniæ, 1761 to 1883. Fol.
F. d. S... ..	La Flore des Serres et des Jardins de l'Europe. 1845-82. 23 vols. 8vo.*
Fl. Ment. ..	Moggridge (J. T.). Contributions to the Flora of Mentone. London, 1864-8.
Flora	Flora oder allgemeine botanische Zeitung. 1818-42. 25 vols. 8vo. [New Series] 1843, &c.*
F. M.	Floral Magazine. London, 1861-71, 8vo. 1872-81, 4to.
F. & P... ..	Florist and Pomologist. London, 1868-84. 8vo.
G. C.	The Gardeners' Chronicle and Agricultural Gazette. London, 1841-65. Fol.
G. C. n. s. ..	The Gardeners' Chronicle. New Series, 1866, &c. Fol.*
G. G.	Gray (A.). Genera Floræ Americæ. Boston, 1848-9. 2 vols. 8vo.
G. M.	The Gardeners' Magazine. Conducted by Shirley Hibberd. London.*
G. M. B. ..	The Gardeners' Magazine of Botany. London, 1850-1. 3 vols. 8vo.
Gn...	The Garden. London, 1871, &c. 4to.*
G. W. F. A...	Goodale (G. L.). Wild Flowers of America. Boston, 1877. 4to.
H. B. F. ..	Hooker (W. J.). The British Ferns. London, 1861. 8vo.
H. E. F. ..	Hooker (W. J.). Exotic Flora, Edinburgh, 1823-7. 3 vols. 8vo.
H. F. B. A. ..	Hooker (W. J.). Flora boreali-americana. London, 1833-40. 2 vols. 4to.
H. F. T. ..	Hooker (J. D.). Flora Tasmaniæ.* London, 1860. 2 vols. 4to. This is Part 3 of "The Botany of the Antarctic Voyage of H.M. Discovery Ships *Erebus* and *Terror*, in the years 1839-43."
H. G. F. ..	Hooker (W. J.). Garden Ferns. London, 1862. 8vo.
H. S. F. ..	Hooker (W. J.). Species Filicum. London, 1846-64. 5 vols. 8vo.
I. H.	L'Illustration Horticole. Gand, 1850, &c. 8vo.
I. H. n s. ..	L'Illustration Horticole. New Series. 8vo.*
I. H. Pl. ..	*See* C. H. P.
J. B.	Journal of Botany. London, 1863. 8vo.*
J. F. A	Jacquin (N. J.). Floræ austriacæ . . . Icones. Viennæ, 1773-8. 5 vols. Fol.
J. H.	Journal of Horticulture and Cottage Gardener. Conducted by Dr. Robert Hogg. London, 1849, &c. 4to.*
J. H. S... ..	Journal of the Horticultural Society. London, 1846, &c. 8vo.*
K. E. E. ..	Kotschy (Theodor). Die Eiche Europa's und des Orient's. Wien, Olmüz, 1858-62. Fol.
L. B. C... ..	Loddiges (C.). Botanical Cabinet. London, 1812-33. 20 vols. 4to.
L. C. B... ..	Lindley (J.). Collectanea botanica. London, 1821. Fol.
L. E. M. ..	La Marck (J. B. P. A. de M. de). Encyclopédie methodique . . . Botanique. Paris, 1783-1817. 13 vols. 4to.
L. J. F... ..	Lemaire (C.). Le Jardin fleuriste. Gand, 1851-4. 4 vols. 8vo.
L. R.	Lindley (J.). Rosarum Monographia. London, 1820. 8vo.
L. S. O... ..	Lindley (J.). Sertum Orchidaceum. London, 1838. Fol.
L. & P. F. G.	Lindley (J.) and Paxton (J.). Flower Garden. London. 1851-3. 3 vols. 4to.
M. A. S. ..	Salm-Dyck. Monographia Generum Aloes et Mesembryanthemi. Bonnæ, 1836-63. 4to.
N.	Burbidge (F. W.). The Narcissus: Its History and Culture. With a Scientific Review of the Genus by J. G. Baker, F.L.S. London, 1875. 8vo.
N. S.	Nuttall (T.). North American Sylva. Philadelphia, 1865. 3 vols. 8vo.
P. F. G. ..	*See* L. & P. F. G.
P. M. B. ..	Paxton (J.). Magazine of Botany. London, 1834-49. 16 vols. 8vo.
Ref. B.	Saunders (W. W.). Refugium botanicum. London, 1869-72. 8vo.
R. G.	Regel (E.). Gartenflora. Erlangen, 1852, &c. 8vo.*
R. H.	Revue Horticole. Paris, 1852.*
R. S. H. ..	Hooker (J. D.). The Rhododendrons of Sikkim-Himalaya. London, 1849-51. Fol.
R. X. O. ..	Reichenbach, *fil.* (H. G.). Xenia Orchidacea. Leipzig, 1858. 4to.*
S. B. F. G. ..	Sweet (R.). British Flower Garden. London, 1823-9. 3 vols. 8vo. Second Series. London, 1831-8. 4 vols. 8vo.
S. C	Sweet (R.). Cistineæ. London, 1825-30. 8vo.
S. E. B... ..	Smith (J. E.). Exotic Botany. London, 1804-5. 2 vols. 8vo.
S. F. A... ..	Sweet (R.). Flora australasica. London, 1827-8. 8vo.
S. F. d. J. ..	Siebold (P. F. de) and Vriese (W. H. de). Flore des Jardins du Royaume des Pays-Bas. Leide, 1858-62. 5 vols. 8vo.
S. F. G... ..	Sibthorp (J.). Flora græca. London, 1806-40. 10 vols. Fol.
S. H. Ivy. ..	Hibberd (Shirley). The Ivy: a Monograph. London, 1872. 8vo.
Sw. Ger. ..	Sweet (Robert). Geraniaceæ, the Natural Order of Gerania. 1828-1830.
Sy. En. B. ..	Syme (J. T. B.), *now* Boswell. English Botany . . . Ed. 3. London, 1863-85. 12 vols. 8vo.
S. Z. F. J. ..	Siebold (P. F. von) and Zuccarini (J. G.). Flora Japonica. Lugd. Bat., 1835-44. Fol.
T. H. S... ..	Transactions of the Horticultural Society. London, 1805-29. 7 vols. 4to.
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T. S. M. ..	Emerson (G. B.). Trees and Shrubs . . . of Massachusetts. Boston. Ed. 2, 1875. 2 vols. 8vo.
W. D. B. ..	Watson (P. W.). Dendrologia Britannica. London, 1825. 2 vols. 8vo.
W. F. A. ..	*See* G. W. F. A.
W. O. A. ..	Warner (R.) and Williams (B. S.). The Orchid Album. London, 1882. 4to.*
W. S. O. ..	Warner (R.). Select Orchidaceous Plants. London. Series i, 1862-65. Fol. Series ii, 1865-75. Fol.
W. & F. ..	Woods and Forests. 1883-4. 1 vol. 4to.

* Is still in course of publication.

Eritrichium—*continued.*

spot on the rockery, where it would alway be moist. Increased by seeds, or by divisions.

E. nanum (dwarf). *fl.* brilliant sky-blue, with a yellowish eye, not unlike those of *Myosotis alpestris*, but larger. Summer. *l.* linear-obovate, covered with long silky-white hairs. *h.* 2in. to 3in. Alps, 1869. It has been enthusiastically termed the Glory of the Alpine Flora. (B. M. 5853.)

ERNODEA MONTANA. A synonym of *Putoria calabrica.*

ERODIUM (from *erodios*, a heron; the carpels resembling the head and beak of that bird). Heron's Bill. ORD. *Geraniaceæ*. A genus of about fifty species of pretty hardy or half-hardy herbs or sub-shrubs, natives of Europe (Britain), North Africa, and temperate Asia (rare in South Africa and Australia). Peduncles generally many-flowered. Leaves various in form. Every part of the plant, when bruised, emits a strong peculiar odour. Erodiums form admirable subjects for rockwork, in dry, sunny situations, and in a sandy soil. Increased by divisions, or by seeds.

E. alpinum (alpine). *fl.* purple, about 1in. across, six to ten in an umbel; petals obtuse, larger than the long-pointed sepals. May. *l.* smoothish, bipinnatifid. Stem branched. *h.* 1ft. Mountains of Southern Italy, 1814. Hardy.

E. caruifolium (Carum-leaved). *fl.* red, about ½in. across, eight to ten in an umbel. Spring. *l.* alternately pinnate; leaflets deeply bipinnate; midrib of under surface with soft white hairs. *h.* 6in. to 10in. Mountains of Central Spain. Hardy.

E. glandulosum (glandular).* A synonym of *E. macradenum.*

E. hymenodes (Hymen-like). *fl.* pink; upper petals with a reddish-brown spot at the base; peduncles many-flowered. Spring and summer. *l.* somewhat three-lobed, or three-parted, very blunt, deeply toothed. Branches clothed with long, soft hairs. Stem erect, branched, shrubby at the base. *h.* 1ft. Mount Atlas, 1789. Half-hardy. SYN. *E. trilobatum.* (B. M. 1174.)

E. macradenum (large-glanded).* *fl.* pale violet; petals acute, the two broadest ones dark purple at the base; peduncles many-flowered. June and July. *l.* clothed with glandular pubescence, pinnate, with bipinnatifid segments and lanceolate-linear lobes. Plant stemless. *h.* 6in. Pyrenees, 1798. Hardy. SYN. *E. glandulosum.* (B. M. 5665; Gn., Aug. 30, 1884.)

E. Manescavi (Manescaut's).* *fl.* purplish-red, disposed in umbels. Summer. *l.* pinnate; leaflets oblong, deeply cut, lower ones the largest. *h.* 1ft. to 2ft. Pyrenees. Hardy.

E. pelargoniiflorum (Pelargonium-flowered).* *fl.* white, spotted with purple; peduncles umbellate, eight to ten-flowered. Summer. *l.* radical, petiolate, ovate-cordate. Stem elongated, branched, ascending. Anatolia. Hardy. (B. M. 5206.)

E. petræum (rock). *fl.* purple; petals retuse; peduncles many-flowered. June. *l.* smoothish, pinnate, with pinnatifid segments and lanceolate-linear lobes. Plant stemless. *h.* 3in. to 6in. South France and Spain, 1640. Hardy.

E. Reichardi (Reichard's).* *fl.* white, faintly veined with pink; peduncles one-flowered. April to September. *l.* small, cordate, crenated, obtuse, smoothish. *h.* 2in. to 3in., forming a dense tuft. Majorca, 1783. Half-hardy.

E. romanum (Roman). *fl.* purplish; petals equal, longer than the sepals; peduncles many-flowered. Spring. *l.* pinnate; leaflets ovate, deeply cut. *h.* 6in. to 9in. South Europe, 1724. Hardy biennial. (B. M. 377.)

E. trichomanefolium (Trichomanes-leaved). *fl.* flesh-coloured, with darker lines; petals blunt, a little longer than the sepals; peduncles four-flowered. Summer. *l.* hairy, rather glandular, bipinnate, with oblong-linear lobules. Plant stemless. *h.* 4in. to 6in. Mount Lebanon. Hardy.

E. trilobatum (three-lobed). A synonym of *E. hymenodes.*

EROSE. Gnawed, bitten. A term used to denote a particular kind of irregular denticulation.

EROTEUM. *See* **Freziera.**

ERPETION. *See* **Viola.**

ERVUM. This genus is now merged, by the authors of the "Genera Plantarum," into **Vicia** (which *see*).

ERYNGIUM (from *eringion*, the old Greek name used by Theophrastus, &c.). Eryngo. ORD. *Umbelliferæ.* A genus of hardy or nearly hardy herbs, usually perennial and spiny. It comprises more than a hundred species, natives of temperate and sub-tropical regions, the majority being South American. Flowers congregated into oblong or roundish dense heads; lower bracts usually the largest, and forming an involucre round the head of flowers. Radical leaves, as well as the cauline ones, sheathing more or less at the base. Many species of this genus are very handsome plants, and are well suited for growing in borders and in sub-tropical gardens. They thrive best in a light sandy soil. Increased by carefully-made divisions, or by seed.

E. alpinum (alpine).* *fl.* in oblong heads; involucre, along with the upper part of the herb and the flowers, of a beautiful blue colour. July and August. *l.*, radical and lower cauline ones on long petioles, deeply cordate, serrate-toothed; upper cauline ones palmately lobed, ciliately serrated; leaves of the involucre ten to twenty, rather soft, a little longer than the head of flowers. *h.* 1½ft. to 2ft. Europe, 1597. Hardy. (B. M. 922.)

E. amethystinum (amethyst-coloured).* *fl.* amethyst colour, in globose heads. July and August. *l.*, radical ones pinnatifid; lobes cut, spiny, somewhat pinnatifid. Stems smoothish, corymbosely branched at the apex; leaves of the involucre seven to eight, lanceolate, furnished with a few teeth at the base, much exceeding in length the head of flowers. *h.* 1ft. to 2ft. Europe, 1648. Hardy.

E. aquaticum (aquatic). *fl.* white or very pale blue, in globose heads. July to September. *l.* broadly linear, with parallel nerves, remotely spinosely-ciliate; lower leaves rather ensiform; upper ones lanceolate, toothed; leaves of the involucre eight to nine, shorter than the heads of flowers. *h.* 2ft. to 3ft. North America, 1699. Hardy. SYN. *E. yuccæfolium.* (B. R. 372.)

E. Bourgati (Bourgat's).* *fl.* bluish, in ovate heads. June to August. *l.*, radical ones orbicular, tripartite; lobes pinnatifid or cut in a forked manner, quite entire between the divisions; leaves of involucre ten to twelve, lanceolate, pungent, erect, much longer than the head of flowers. Stems simple, a little branched at the apex. *h.* 1ft. to 2ft. Pyrenees, 1731. Hardy.

E. bromeliæfolium (Pineapple-leaved). *fl.* white, in round heads. July. *l.* with parallel nerves, bearing large subulate teeth, which are shorter than the breadth of the leaves; radical ones very long, broadly lanceolate-linear; involucral leaves ten, lanceolate, exceeding the head of flowers. *h.* 3ft. to 4ft. Mexico. Half-hardy.

E. campestre (field). *fl.* blue, in roundish heads. July and August. *l.*, radical ones nearly ternate; segments pinnatifid; lobes ovate; cauline ones auriculated; leaves of involucre linear-lanceolate, exceeding the heads of flowers. Stem panicled. *h.* 1ft. to 2ft. Europe, &c. (Britain). (Sy. En. B. 570.)

E. dichotomum (spreading). *fl.* blue, in globose heads. July and August. *l.*, radical ones petiolate, oblong, cordate at the base, toothed; cauline ones palmately parted, spreading; lobes spiny-toothed; leaves of involucre lanceolate, much longer than the heads of flowers. *h.* 1ft. to 2ft. South Europe, &c., 1820. Hardy. *E. Lasseauxii* (R. H. 1874, 375) is closely allied to *E. dichotomum*, but the panicle of reddish-purple flowers is loose.

E. eburneum (ivory). *fl.* whitish; panicle cylindrical in outline. Autumn. *l.*, radical ones 2ft. to 3ft. in length, edged with rigid spines; cauline ones broad. *h.* 6ft. Brazil, 1872. Hardy. (R. H. 1876, 112.)

FIG. 729. ERYNGIUM GIGANTEUM.

Eryngium—*continued.*

E. giganteum (gigantic).* *fl.* blue, in ovate heads. July and August. *l.*, radical ones on long petioles, profoundly cordate, crenate-toothed; cauline ones stem-clasping, deeply lobed, serrated; leaves of involucre eight to nine, large, longer than the heads of flowers. Stem dichotomously branched, 3ft. to 4ft. high. Caucasus, 1820. Hardy. See Fig. 729.

E. maritimum (sea). Sea Holly. *fl.* very pale blue, in roundish heads. July to October. *l.* of a whitish-glaucous hue, coriaceous; radical ones on long petioles, roundish, cordate, spiny-toothed; superior ones stem-clasping, palmately lobed; leaves of involucre five to seven, ovate, exceeding the heads of flowers. *h.* 1ft. to 1½ft. Europe, &c. (Britain). (Sy. En. B. 569.)

E. pandanifolium (Pandanus-leaved).* *fl.* purplish, in rather small globose heads, with scarcely any involucre; panicle very large, dichotomous. *l.*, radical ones 4ft. to 6ft. long, very glaucous, concave, acuminated; margins spiny. *h.* 10ft. to 15ft. Monte Video. Half-hardy. (G. C. n. s., v. 76.)

E. paniculatum (panicled). *fl.* greenish-white, with a small horizontal involucre, rather large. *l.* with parallel nerves, linear, spiny-ciliated. Stem nearly naked, bearing at the apex umbellate branches; branches bearing one to three heads. *h.* 3ft. to 5ft. Monte Video. Half-hardy. (G. C. n. s., v. 76.)

FIG. 730. FLOWER OF ERYNGIUM PLANUM.

E. planum (flat-leaved). *fl.* blue, in roundish heads. July and August. *l.*, lower ones on long petioles, oval, cordate, undivided; superior ones five-parted, serrated; leaves of involucre six to eight, lanceolate, about equal to or exceeding the heads of flowers. *h.* 2ft. Eastern Europe, &c., 1596. Hardy. See Fig. 730.

E. platyphyllum (broad-leaved). A synonym of *E. serra.*

E. serra (saw). *fl.* white, in small globose heads. Autumn. *l.*, radical ones in a spreading rosette, 1ft. to 2ft. long, 4in. broad, nearly flat, varying from deeply pinnatifid to merely spinous on the margins. *h.* 4ft. to 6ft. Brazil, 1872. Half-hardy. SYN. *E. platyphyllum.*

E. yuccæfolium (Yucca-leaved). A synonym of *E. aquaticum.*

ERYNGO. *See* **Eryngium.**

ERYSIMUM (*Erysimon*, the old Greek name of Hippocrates, from *eryo*, to draw; on account of its effects in drawing blisters). Hedge Mustard. ORD. *Cruciferæ.* A genus of about seventy species of hardy annual, biennial, or perennial hoary herbs, natives of temperate and cold regions of the Northern hemisphere, usually branched. Racemes elongated, terminal, many-flowered. Leaves variable, usually oblong-linear, entire or toothed. A few species only of this somewhat extensive genus are worth growing; and these exceptions are, for the most part, very showy border plants, of extremely easy cultivation in any ordinary garden soil. Increased by seeds; the perennials by seeds and divisions.

E. alpinum (alpine).* *fl.* sulphur-yellow, sweet-scented. May. *l.* lanceolate, distantly toothed, covered with starry pubescence. Stem simple, straight. *h.* 6in. Norway, 1823. Perennial. SYN. *Cheiranthus alpinus.*

E. asperum (rough). *fl.*, petals yellow, with white claws. July. *l.* linear-oblong; lower ones dentately-runcinate, pubescent, scabrous, and, as well as the stem, greyish, with forked, appressed hairs. *h.* 8in. North America, 1824. Biennial. (H. F. B. A. i. 22.)

E. Marschallianum (Marschall's). *fl.* bright yellow. July. *l.* lanceolate, narrowed at the base, toothed. *h.* 1ft. Caucasus. Biennial.

E. ochroleucum (yellowish-white).* *fl.* pale yellow, scarcely scented; petals obovate. April to July. *l.* oblong-lanceolate, somewhat toothed, covered with two-parted hairs, or smooth. Stems decumbent, branched. Alps of Jura, 1819. Perennial. Plant procumbent. SYN. *Cheiranthus ochroleucus.*

Erysimum—*continued.*

E. o. helveticum (Swiss). *fl.* yellow; petals obovate. Spring. *l.* linear-lanceolate, either entire or toothed. Stems somewhat ascendent, clothed with forked hairs. *h.* 1ft. Rhætia, 1819. Biennial.

E. Perofskianum (Perofski's).* *fl.* deep reddish-orange. *h.* 1ft. Caucasus, 1838. This is one of the showiest hardy annuals grown; it is admirably adapted for beds, borders, edgings, &c.; and thrives almost anywhere; the seeds may be sown in September for a spring display. (B. M. 3757.)

E. pulchellum (pretty). *fl.* sulphur-yellow. Spring. *h.* 1ft. 1880. Perennial. A very pretty plant, differing from the majority of this genus in being of remarkably compact growth, and forming itself into a dense tuft of foliage. (R. H. 1880, 412.)

E. pumilum (dwarf).* *fl.* pale sulphur, fragrant. Summer. *l.* linear-lanceolate, somewhat toothed, greyish-green. *h.* 1in. to 3in. Europe, 1823. An elegant little perennial rock-plant. (L. B. C. 899.)

ERYTHEA (a fanciful name: Erythea, in the mythology of the Greeks, was one of the Hesperides, daughters of Evening, or the West, "who dwelt on an island of the ocean, on the western edge of the world, and guarded a garden with golden apples"). ORD. *Palmeæ.* A genus of two species of greenhouse palms, from Southern California. They are tall trees, with naked trunks, fan-shaped, plicate, filiferous leaves, and densely tomentose sheaths and inflorescence. Flowers solitary or in clusters, scattered along the numerous branches of the pendent panicle. The genus is very nearly allied to *Livistona*, of Australia and Eastern Asia, which differs in its distinct filaments, oblong fruit, with hard crustaceous pericarp, the leaf segments entire or nearly so, not filiferous on the margins. For culture, *see* **Areca.**

E. edulis (edible). A handsome species, with a slender trunk, 30ft. high, and 15in. or more in diameter. Each tree bears one to four panicles, blossoming late in March; the fruit clusters are said to weigh 40lb. to 50lb. Guadalupe Island. SYN. *Brahea edulis.*

ERYTHRÆA (from *erythros*, red; colour of flowers of some species). Centaury. SYNS. *Gyrandra* and *Hippocentaurea.* ORD. *Gentianeæ.* A genus of above thirty species of small hardy or half-hardy annual, biennial, or perennial plants. Flowers pink, yellow, or rarely white, terminal, sessile, or pedicellate. Leaves sessile, opposite, decussate; radical ones rosulate. Erythræas form elegant little plants for rockwork, grown in a sandy loam soil. Increased by seeds, or by divisions.

E. Centaurium (Centaury). *fl.* rose-coloured. *l.* ovate-lanceolate. Stem dichotomously panicled, corymbose. *h.* 3in. to 12in. North Africa, Europe (Britain). Annual. This plant was formerly much employed by physicians as a vermifuge. (Sy. En. B. 909.)

FIG. 731. FLOWERS OF ERYTHRÆA DIFFUSA.

E. diffusa (diffuse).* *fl.* bright deep rose. *l.* fleshy, entire, glabrous, shining, generally concave. *h.* 2in. to 3in. Western Europe. Perennial. A charming little rock plant. See Fig. 731.

Erythræa—*continued.*

E. littoralis (shore). *fl.* pink, crowded, sessile, fasciculate. June. *l.* ovate-oblong, obtuse. Stem simple or branched, dwarf, tetragonal. *h.* 3in. Europe (Britain). Biennial. (Sy. En. B. 908.)

FIG. 732. FLOWERING STEM OF ERYTHRÆA MUHLENBERGI.

E. Muhlenbergi (Muhlenberg's).* *fl.* of a deep pink colour, with a greenish-white star in the centre. Spring. *l.* oblong-obtuse, the floral ones lanceolate. Branches numerous, slender. *h.* 8in. California. An excellent plant for growing on rockwork, or for margins of a loamy border. See Fig. 732.

E. venusta (charming). *fl.* usually pink, star-like; corolla 1in. in diameter; tube slender; lobes of the limb elliptic, obtuse, deep rose-coloured, yellow at the base, as long as the tube. August. *l.* in pairs, scattered, sessile, ½in. to 1in. long, oblong or ovate-oblong, rounded at the apex; base rounded or cordate; upper and floral leaves narrower and acute or acuminate. Stem simple or cymosely branched above, few-flowered. *h.* 6in. to 10in. California, 1878. A slender erect hardy annual. (B. M. 6396.)

ERYTHRINA (from *erythros*, red; referring to the colour of the flowers), Coral-tree. ORD. *Leguminosæ*. A genus of about thirty species of trees and shrubs, principally natives of tropical regions in both the New World and the Old, and at the Cape. Flowers coral-red, large, in dense racemes, produced usually before the development of the large leaves (in a few species, on the ends of the annual shoots); calyx split, spathaceous, bilabiate; petals very unequal; standard large; upper stamen free to the base, or sometimes connate with the others half-way up the filaments; anthers uniform. Pod linear, turgid, torulose. Leaves constantly trifoliolate.

Cultivation. All the Erythrinas like a strong loamy soil, an abundance of water when not at rest, and exposure to bright sunlight. The tree and shrubby-stemmed species should be kept growing all summer in a warm house, and treated liberally, so as to induce vigorous growth. In September, water should be gradually withheld, so that the wood may ripen, the leaves fall off, and the plants go to rest for the winter. Early in spring, they should be repotted or top-dressed, placed in a hot, moist temperature, and supplied with plenty of water at the roots. This treatment should cause them to produce their large racemes of gorgeous flowers. If it be necessary to cut away any of the branches, it should not be done till after the flowers are over, as these are developed on the ripened wood

Erythrina—*continued.*

of the previous year. The herbaceous-stemmed species, *E. crista-galli* and *E. herbacea*, form a stout rootstock, from which shoots are annually produced, and upon these the flowers are borne in autumn. Both these kinds should be started in heat, in spring, unless when planted out of doors, in which case they may be left to start themselves on the approach of warm weather. For pot specimens, however, a little extra heat assists the rootstocks, and is conducive to the free production of shoots. As these increase in strength, a lower temperature will be sufficient, till, finally, the plants may be placed out of doors for the summer. By taking off the young shoots with a heel, in spring, and inserting them in sandy soil, on a little bottom heat, a stock is easily obtained. After flowering, the shoots die down, when the plants may be placed under stages in cool houses, where they can be kept dry and at rest till the following spring. Erythrinas, planted out of doors, require a covering of leaves or cocoa-nut fibre, to protect the boles from frost.

E. Corallodendron (Coral-tree). *fl.* deep scarlet, large, in long racemes, appearing when the leaves have fallen. May and June. *l.*, leaflets broad, rhomboid-ovate, acute; petioles unarmed. Stem arboreous, prickly. *h.* 6ft. to 12ft. West Indies, 1690. SYN. *E. spinosa.*

FIG. 733. PORTION OF ANNUAL HERBACEOUS FLOWERING SHOOT OF ERYTHRINA CRISTA-GALLI.

E. crista-galli (Cockscomb).* Common Coral-tree. *fl.* bright deep scarlet, disposed in large terminal racemes. May to July. *l.*, leaflets oval or ovate, glaucescent, coriaceous, bluntish; petioles prickly, glandular. Stems woody. *h.* 6ft. to 8ft. Brazil, 1771. This fine species is by far the most frequently cultivated one. In the southern counties, it is almost hardy. SYN. *E. laurifolia.* See Fig. 733. (B. M. 2161.)

E. glauca (glaucous). *fl.* copper-coloured. Summer. *l.*, leaflets ovate, glaucous beneath; petioles almost unarmed. Stem arboreous, prickly. *h.* 10ft. South America, 1819.

E. herbacea (herbaceous). *fl.* deep scarlet, distant; racemes elongated. June to September. *l.*, leaflets ovate or somewhat hastate. Branches herbaceous, annual, and, as well as the leaves, unarmed and glabrous. *h.* 2ft. to 3ft. Carolina, 1724. (B. M. 877.) *E. Bidwilli* is a hybrid between *E. herbacea* and *E. crista-*

Erythrina—*continued.*

galli, with annual shoots, and axillary and terminal spicate flowers.

E. Humei (Hume's). *fl.* brilliant scarlet, fading to purple, in a sub-verticillate spike; peduncles axillary, longer than the leaves, erect, rounded, studded with white, linear warts. *l.* ternate, rhomb-shaped, acuminate, with an obtuse point; petioles alternate, horizontal, longer than the leaves, armed with a few distant prickles. Stem erect, woody. *h.* 30ft. to 60ft. South Africa. A very elegant stove tree. (B. M. 2431, under name of *E. caffra.*)

Erythrina—*continued.*

E. laurifolia (laurel-leaved). A synonym of *E. crista-galli.*

E. speciosa (showy). *fl.* deep crimson; racemes and calyces velvety. August to October. *l.*, leaflets broad, slightly three-lobed, acuminated, glabrous; petioles and ribs of leaves prickly. Stems shrubby, prickly. *h.* 6ft. to 10ft. West Indies, 1805. (A. B. R. 443.)

E. spinosa (spinous). A synonym of *E. Corallodendron.*

Other very good garden forms, chiefly of *E. crista-galli*, are: *Cottyana*, flowers deep rich red; *floribunda*, flowers rosy-crimson;

FIG. 734. ERYTHRINA INDICA PARCELLI.

E. indica (Indian).* *fl.* of a splendid scarlet colour. *l.*, leaflets broad-ovate, acute, glabrous; petioles unarmed. Stem arboreous, prickly; spines black. *h.* 20ft. to 30ft. East Indies, 1814. There is a handsome white-flowered form of this species.

E. i. marmorata (marbled). *l.* large, broad, blotched and spotted with white in a very effective manner. Polynesia, 1879. An elegant variegated plant.

E. i. Parcelli (Parcell's). *l.* alternate; leaflets three, with a yellow variegation, sometimes forming a feather-like stripe along the costa and main veins, sometimes more diffused, and forming a band 1in. wide. Stem stout, woody. South Sea Islands. See Fig. 734, for which we are indebted to Mr. Wm. Bull.

Madame Belanger, flowers velvety, rich dark reddish-crimson; *ornata*, flowers dark vermilion; *ruberrima*, flowers large, brilliant crimson, rosy-tinted; *spectabilis*, leaves with fine bold variegation, markings chiefly yellow.

ERYTHROCHITON (from *erythros*, red, and *chiton*, a tunic; calyx red). ORD. *Rutaceæ.* A genus of four species of very ornamental stove evergreen trees, natives of Brazil, Guiana, and New Grenada. They thrive well in a compost of loam and leaf mould. Increased by seeds, or by cuttings.

Erythrochiton—*continued.*

E. braziliensis (Brazilian). *fl.* large, in the axillæ of the bract-like leaves, two to four, or more in a cluster, on short, bracteolate pedicels; calyx red; corolla white. July. *l.* alternate, simple, stalked, lanceolate, very long, quite entire, smooth. Axillary branches almost leafless, bearing the flowers at their ends. *h.* 10ft. Brazil, 1842. (B. M. 4742.)

E. hypophyllanthus (leaf-flowering). *fl.* white; cymes short, one to three-flowered, developed on the costa beneath. *l.* bold, cuneate-oblong, 1ft. to 1½ft. long. Columbia, 1853. Habit erect, unbranched. (B. M. 5824.)

ERYTHROLÆNA CONSPICUA. *See* **Cnicus conspicuus.**

ERYTHRONIUM (from *erythros*, red, the colour of the flowers in the European species; *Erythronion* is the name given by Dioscorides to a kind of Orchis). Dog's-tooth Violet. ORD. *Liliaceæ.* A genus of seven species of very ornamental dwarf, stemless, hardy, bulbous plants, of which one species is dispersed through Europe, Asiatic Russia to Japan, and the rest are North American. Flowers on a scape, solitary, pendulous; perianth segments six, erect or reflexed. Leaves radical, ovate, or ovate-lanceolate. They succeed in almost any light soil, but prefer a mixture of loam and peat. Propagated by offsets, which are produced freely when the plants do well. The best time for obtaining them, or for replanting, is immediately the leaves die away, after flowering. Erythroniums have a better effect when planted in groups than if placed in very small quantities separately; the bulbs should be inserted about 3in. deep. If left untouched afterwards, an annual top-dressing of good soil will be advantageous. Erythroniums succeed best in a sheltered position on a rockery, but are also suitable for the front line of mixed borders, or for shrubberies. They may also be grown in pots, in a cold frame, for greenhouse decoration when in flower. The flowers appear in March and April, and are attractive outside at that early season.

E. americanum (American).* *fl.* bright yellow, about 1in. across; perianth segments spreading, oblong-lanceolate, obtuse. *l.* elliptical-lanceolate, recurved at top, dotted and marbled with violet and white. *h.* 3in. to 6in. North America. (B. M. 1113.)

FIG. 735. ERYTHRONIUM DENS-CANIS, Large White Variety.

Erythronium—*continued.*

E. dens-canis.* Dog's-tooth Violet. *fl.* purplish-rose or whitish, about 2in. in diameter, solitary, drooping. *l.* blotched with purple-brown and white, radical, stalked, broadly-oval, rounded at the base, acuminated. *h.* 6in. Europe, 1596. (B. M. 5.) There are several forms, varying in the colour of the flowers. See Fig. 735.

E. grandiflorum (large-flowered). *fl.* yellow or cream-colour, with a more or less orange base, solitary or often in a raceme of two to six or more; segments lanceolate and somewhat acuminate, strongly recurved, 1in. to 2in. long. *l.* not mottled, always closely approximate, oblong-lanceolate, 3in. to 6in. long, with broad, usually short petioles. North-west America. (B. R. 1786.)

E. g. giganteum (gigantic). *fl.* white, with a yellow and orange base, large. *l.* mottled. Washington Territory. (B. M. 5714.)

ERYTHROPHLŒUM (from *erythros*, red, and *phloios*, bark; referring to the red juice which flows from the tree when cut). Red-water Tree. ORD. *Leguminosæ.* A small genus, containing three or four species of unarmed stove evergreen trees. Flowers small, almost sessile, in long, cylindrical spikes, forming a terminal panicle; petals five, small, slightly imbricate; stamens ten, inserted with the petals, free. Leaves bipinnate. For culture, *see* **Acacia.**

E. guineense (Guinea). *fl.* pale yellow. *l.* bipinnate; leaflets opposite, oval, oblique, from roundish to lanceolate, repand, acuminated and entire. *h.* 40ft. to 100ft. Sierra Leone, 1823. The bark of this tree is very poisonous.

E. Laboucherii (Labouchere's). *fl.*, spikes rather dense, nearly sessile, 1in. to 3in. long; petals longer than the calyx, with woolly edges; stamens more than twice as long as the petals, inserted in two rows. *l.*, pinnæ opposite, in two or three pairs; leaflets four to nine, alternate, obliquely obovate or orbicular, very obtuse or retuse. Branches glabrous. North Australia. A lofty, hard-wooded tree.

ERYTHRORCHIS. *See* **Galeola.**

ERYTHROTIS BEDDOMEI. *See* **Cyanotis kewensis.**

ERYTHROXYLEÆ. A tribe of **Lineæ** (which *see*).

ERYTHROXYLON (from *erythros*, red, and *xylon*, wood; some of the species have red wood). Including *Sethia.* ORD. *Lineæ.* A very widely-distributed genus of about fifty species of stove or greenhouse evergreen trees, with small white or yellowish-green flowers, which arise from the axils of the stipulaceous scales. *E. Coca* thrives in fibry loam; and cuttings of half-ripe shoots will root in sand, under a hand glass, in heat.

E. Coca (Coca). *fl.* greenish, small, three or four together, axillary. *l.* alternate, lanceolate or oval, entire. *h.* 3ft. to 6ft. 1869. This is one of the most interesting species of the genus, and is extensively cultivated; its leaves are largely employed by the South Americans as a masticatory, under the name of Coca. Coca also constitutes an article of commerce with the Indians. Greenhouse. (B. M. Pl. 40.)

ESCALLONIA (named in honour of Escallon, a Spanish traveller in South America, who found the first species of this genus in New Grenada). Ord. *Saxifrageæ.* A genus comprising about thirty-five species of ornamental half-hardy evergreen shrubs, all natives of South America. Flowers usually in terminal racemes or panicles. Leaves scattered, serrated, or entire. These fine plants grow freely in almost any ordinary well-drained garden soil. For training against walls, few shrubs are more suitable than *E. floribunda* and *E. macrantha.* In the south of England, and on the sea coast more especially, they flourish remarkably well, and are grown extensively as hedge or shelter plants. Propagation may be effected by cuttings, made of half-ripened wood, inserted in sandy loam, and covered with a hand-light; by layers, or by suckers.

E. floribunda (bundle-flowered).* *fl.* white; corymbs terminal, rather panicled, much-branched, leafy; petals obovate-spathulate. July. *l.* oblong, obtuse, finely crenulated or quite entire. Branches covered with clammy resin. *h.* 10ft. New Grenada, 1827. SYN. *E. montevidensis.* (B. M. 6404.)

E. illinita (varnished). *fl.* white; panicle terminal, many-flowered, leafy; petals on long claws. August. *l.* petiolate obovate or oblong, obtuse, crenulated, attenuated at the base, beset with glandular dots above, and clammy. Branches spreading, resinous. *h.* 5ft. Chili, 1830. (B. R. 1900.)

E. macrantha (large-flowered).* *fl.* crimson-red, rather large;

Escallonia—*continued.*

lower peduncles simple, axillary; upper ones racemose. June. *l.* ovate-elliptic, bluntish, serrated, shining, glandularly dotted below. Branches pubescent, glandular. *h.* 3ft. to 6ft. Chiloe, 1848. (B. M. 4473.) The variety *sanguinea* has deep red flowers.

E. montevidensis (Monte Video). A synonym of *E. floribunda.*

E. organensis (Organ Mountains).* *fl.*, petals deep rose-colour, five, spathulate, the claws erect, linear, so closely placed as to form a tube; limb exactly horizontally patent, oval or obovate, obscurely crenate at the margin. *l.* alternate, oblong, copious, erect, somewhat imbricated, glossy, rigid, dark green above, with a red margin, rather obtuse at the point, tapering at the base into a short petiole. Stems and branches rich red-brown. *h.* 2ft. to 4ft. Organ Mountains, 1844. A lovely plant. (B. M. 4274.)

E. Philippiana (Philippi's). *fl.* white; panicles terminal and lateral, densely crowded. July. *l.* rich green, somewhat spathulate, serrated. Valdivia, 1873. (G. C. n. s., x. 109.)

E. pterocladon (winged-branched). *fl.* white and pink, small, axillary. July. *l.* very small. *h.* 4ft. Patagonia, 1854. (B. M. 4827.)

E. pulverulenta (dusted). *fl.* white; petals obovate; racemes terminal, erect. June. *l.* elliptic, obtuse, on short petioles, serrulated, rather clammy above when young. Branches rather erect, somewhat trigonal. Shrub hairy in every part. *h.* 6ft. to 10ft. Chili, 1831. (S. B. F. G. ii. 310.)

E. punctata (dotted). *fl.* one to four, rarely more, in terminal corymbs, sub-erect; corolla deep dark red. July. *l.* bright green, sessile, or narrowed into a very short petiole, elliptic-ovate, acute, finely serrated, the serration often irregular; upper surface glossy, with deeply impressed veins; under paler, smooth, glabrous, or glandular pubescent, or gland-dotted. *h.* 3ft. to 6ft. Chili. A much-branched evergreen shrub. SYN. *E. rubra punctata.* This is easily distinguished from *E. rubra* by the stalked glands upon the young shoots, &c. (B. M. 6599.)

E. rubra (red).* *fl.* red; petals spathulate; peduncles two to seven-flowered, bracteate. July to September. *l.* obovate-oblong, acuminated, serrated, full of resinous dots beneath. Branches erect, when young clothed with glandular hairs. *h.* 3ft. to 6ft. Chili, 1827. Shrub smoothish. (B. M. 2890.)

E. r. punctata (red-dotted). A synonym of *E. punctata.*

ESCALLONIÆ. A tribe of **Saxifrageæ** (which *see*).

ESCHALOT. *See* **Shallot.**

ESCHSCHOLTZIA (named in honour of J. F. Eschscholtz, M.D., 1793-1831, a celebrated naturalist, who accompanied Kotzebue round the world). SYN. *Chryseis.* ORD. *Papaveraceæ.* Very ornamental hardy annual or perennial glabrous and glaucescent herbs. Sepals cohering in the form of a cap, deciduous. Leaves much divided into narrow segments. Perhaps all the Eschscholtzias here described are mere forms of one very variable species. These showy plants are largely employed in decorating flower borders in spring, summer, and autumn. They are of very easy culture in ordinary garden soil. Seeds may be sown in spring or autumn, in places where they are to flower.

E. californica (Californian).* *fl.* bright yellow, large. Summer. *l.* glaucous, tripinnatifid; segments linear. *h.* 1½ft. North-west America, 1790. Perennial. From this, the first species introduced, have sprung a legion of varieties with flowers of a white, pinkish, or pale yellow colour.

E. c. cæspitosa (tufted). *fl.* yellow, about 1in. across. Summer. *l.* divided into almost thread-like segments. *h.* 6in. A very pretty little annual, with a close, compact habit, and much branched near the base. SYN. *E. tenuifolia.* (B. M. 4812.)

E. c. crocea (yellow).* *fl.* deep rich orange. Summer. *h.* 1ft. California, 1833. Of this showy biennial, there are numerous forms, including white, red, striped, and a double orange-flowered kind.

E. tenuifolia (slender-leaved). A synonym of *E. c. cæspitosa.*

In addition to the foregoing, very showy garden forms have been raised, including *compacta* (orange); *Mandarin* (a gorgeous orange-crimson flowered sort); and several others.

ESPALIERS. A term applied to a mode of training fruit-trees in the open ground, either as permanent features or preparatory to placing them on walls or on a trellis inside a house. Many methods are employed, some of a temporary, and others of a permanent, character. For a single tree, a row of stakes about 5ft. high, driven in the ground, 9in. apart, is suitable. A narrow strip of wood is generally laid on the tops of the stakes, and a nail driven into each, to hold them firmly. Fruit-trees trained as

Espaliers—*continued.*

Espaliers, to separate borders running parallel to walks from the inside garden, sometimes have strained wires fixed for the purpose. Another mode is to have end posts, to which are secured top and bottom rails, with vertical strips of wood nailed to them. The trees may be trained to any desired shape as Espaliers, in the same way as if they were on walls. Full exposure to light

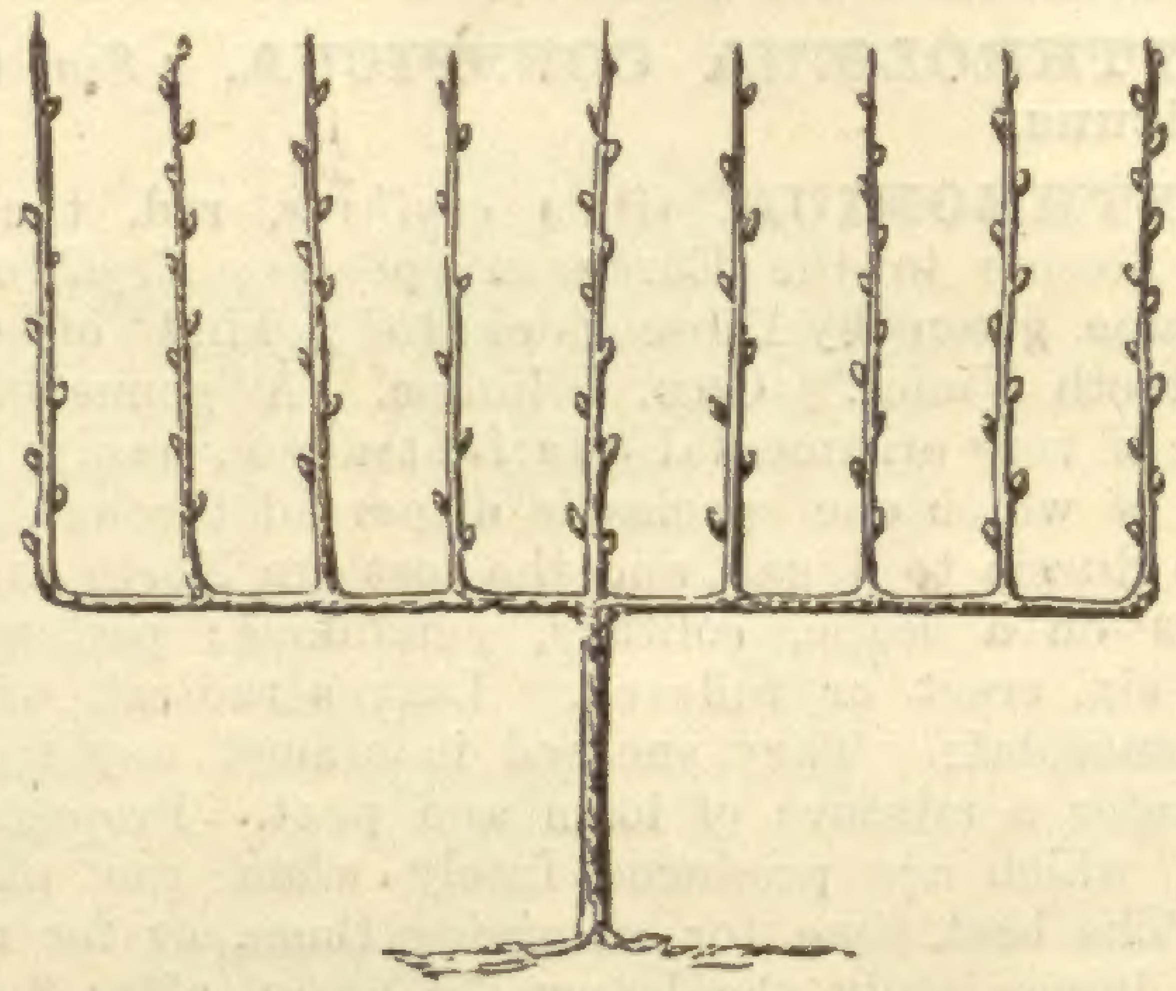


FIG. 736. FRUIT-TREE TRAINED UPRIGHT AS AN ESPALIER.

on both sides is obtained by proper thinning; but the advantages of a wall regarding the protection afforded cannot, of course, be similarly secured. An upright-trained fruit-tree is shown in Fig. 736; the stem is represented rather higher than is usual with trees trained in this way. Stakes at each end, and an Espalier frame fixed to them, would suit such a tree best; or one each of the former might be inserted to the upright branches separately. *See also* **Training.**

ESPARTO GRASS. *See* **Stipa tenacissima.**

ESPELETIA (named in honour of Don Jose de Espeleta, a Viceroy of New Grenada). ORD. *Compositæ.* A genus containing about eleven species of remarkable greenhouse woolly-leaved plants. Flower-heads yellow, sometimes 1in. or more across, corymbose. Leaves alternate, or rarely opposite, entire, lanceolate or linear, wholly covered with dense white or rusty-coloured wool. They thrive in a sandy-peat soil, and should be kept in a dry and airy part of the greenhouse. During damp weather, in winter, the plants should only receive sufficient water to keep the soil moist, and care must be taken that the woolly leaves are not wetted. The species here described are the only ones yet in general cultivation.

E. argentea (silvery). *fl.-heads* yellow, moderately large, the disk inclining to brown; florets all subtended by a ligulate, membranaceous scale. July. *l.* narrow-lanceolate, densely silky and strigose on both sides. *h.* 5ft. to 6ft. New Grenada, 1845. A very remarkable plant. (B. M. 4480.)

E. grandiflora (large-flowered). *fl.-heads* yellow, large. Summer. *l.* lanceolate. *h.* 10ft. New Grenada. This species yields a gum-resin of a beautiful yellow colour, which is largely employed by the native printers in the composition of their inks.

ETIOLATION. *See* **Blanching.**

EUADENIA (from *eu*, well, and *aden*, a gland; in allusion to the appendix at the base of the gynophore terminating in about five minute spherical knobs). ORD. *Capparideæ.* A genus of two or three species of stove herbs or sub-shrubs, from tropical Africa, only the one described below having yet been introduced to cultivation. It thrives in a well-drained loamy soil. Cuttings strike readily in bottom heat.

E. eminens (eminent). *fl.*, petals four, sulphur-yellow, two dorsal ones 4in. long, erect, narrowly linear-subulate, narrowed into a long claw; two lower ones smaller, pointing forward; sepals four, green, lanceolate, acuminate, ½in. long. *l.* alternate, stalked, trifoliolate, quite glabrous. A striking plant, with a "singularly handsome inflorescence, which resembles a candelabrum in its ramification, the yellow petals looking like pairs of gas jets on each branch." West tropical Africa, 1880. (B. M. 6578.)

EUCALYPTUS (from *eu*, well, and *kalypto*, to cover as with a lid; limb of the calyx covering the flower before expansion, and afterwards falling off in one piece, in the shape of a lid or cover). Gum-tree. Including *Eudesmia*. ORD. *Myrtaceæ*. A genus of 140 or more species of tall evergreen greenhouse trees, with very few exceptions natives of Australia, where they constitute a large portion of the forest vegetation. Peduncles axillary, one-flowered, or bearing an umbel of from three to fifteen flowers. Leaves quite entire, coriaceous, usually alternate, very variable, even in the same tree, quite glabrous except in a very few of the species. It is worthy of remark that the Gum Trees, though among the largest trees in the world, have very small, or even minute, seeds. In their native country, the Eucalypti form extensive forests, and grow very fast, some of them reaching an immense height and having trunks in the same proportion. The timber is extremely durable, and is largely used by colonial ship-builders, implement-makers, engineers, &c. None of the species attain a size sufficiently large for use as timber in this country, as they are not hardy enough to withstand a severe winter outside. Several succeed on a south wall with protection in winter, and all are useful decorative greenhouse plants. They are called Gum Trees in consequence of the quantity of gum that exudes from their trunks. *E. globulus*, the Blue Gum, one of the most valuable timber trees of the Southern hemisphere, is also largely cultivated in many parts of the world, especially in the Mediterranean region and in malarious districts in Italy. Further, it is the species grown more than others in this country for its value in sub-tropical gardening, the leaves being of a distinct glaucous hue, and quite different from those of any other plant similarly employed. Eucalypti are best raised from imported seeds, which generally vegetate freely. They should be sown thinly in pots or pans of light sandy soil, and placed in a little heat. *E. globulus*, when intended to be used for sub-tropical bedding or for a group on a lawn, is best sown in August and grown on through the winter for use the following season. By this method, much larger and better plants may be obtained than when sowing is deferred till spring. It is best to raise new plants each year, as lifted ones do not regain their beauty of the preceding season, and they cannot be depended on to stand outside, at least, not in many places. Being fast growing plants, considerable space must be allowed when they become established, either in the open ground or in pots. A rather rich soil, composed of loam and decayed manure, with the addition of some charcoal, to keep it open, is most suitable. *E. citriodora* is very useful for growing in small pots for the conservatory, its scented leaves rendering it a general favourite. Comparatively few of the species are grown in this country.

E. amygdalina (almond-leaved). *fl.*, peduncles axillary or lateral, nearly terete, with four to eight flowers. *l.* alternate, linear-lanceolate, 3in. long, three lines broad, attenuated at the base. 1820. A moderate sized or large tree. (B. M. 3260.) In the Museum, No. 1, at Kew, there is a photograph of the base of a tree from Victoria, known as "Big Ben." The tree measured 56ft. in circumference, at base, and was 400ft. high. This species forms the highest of all known trees; one is recorded measuring 470ft. high, far exceeding even the well-known Giant-trees of California (*Sequoia gigantea*).

E. calophylla (beautiful-leaved). *fl.* rather large, in a terminal corymbose panicle, with one or two sometimes in the upper axils; umbels loose; peduncles flattened, or nearly terete; pedicels longer than the calyx tube. *l.* ovate, ovate-lanceolate, or lanceolate, obtuse or mucronate, acute, rather rigid, with numerous transverse parallel veins, the intramarginal one scarcely distant from the edge. A very beautiful tree. (B. M. 4036, under name of *E. splachnicarpa*.)

E. citriodora (lemon-scented).* *l.* oblong-lanceolate, covered with glandular hairs, which, when gently rubbed, emit a powerful odour, resembling that of the lemon-scented Aloysia. Australia. An interesting greenhouse plant.

E. coccifera (Coccus-bearing).* *fl.* purple; peduncles axillary or lateral, terete, or slightly compressed, bearing each an umbel of four to eight flowers. December. *l.* in the usual form mostly ovate-lanceolate, falcate and very oblique at the base, more or less acuminate, 4in. to 6in. long, thick with very oblique distant

Eucalyptus—*continued.*

anastomosing veins, the intra-marginal one at some distance from the edge. A small, generally very glaucous, tree. SYN. *E. daphnoides*. (B. M. 4637.) There is a variety, *parviflora*, having smaller flowers, and extremely short peduncles.

E. cordata (heart-shaped). A synonym of *E. pulverulenta*.

E. cornuta (horned). *fl.* red, yellow; peduncles axillary, terete or slightly compressed, each bearing six to twelve, or even more flowers, sessile, but not immersed in the receptacle. *l.* lanceolate or ovate-lanceolate, mostly under 4in. long, rather thick; the veins irregularly oblique, the intramarginal one at a distance from the edge. A tall shrub or small tree, with a smooth bark. (B. M. 6140.)

E. daphnoides (Daphne-like). A synonym of *E. coccifera*.

E. gigantea (gigantic). A synonym of *E. obliqua*.

FIG. 737. YOUNG TREE OF EUCALYPTUS GLOBULUS, showing Habit.

E. globulus (globuled).* Blue Gum-tree. *fl.* large, axillary, solitary, or two or three together, closely sessile on the stem, or on a peduncle not longer than thick. *l.*, of the young tree opposite, sessile, and cordate; of the full grown tree, lanceolate or ovate-lanceolate, nearly falcate, 6in. to 12in. long. *h.* sometimes exceeding 300ft. 1810. See Fig. 737. The leaves of this and other species have been supposed to possess febrifugal properties. Smoked in the form of cigars, they have been recommended in asthma. The oil obtained from the leaves is antiseptic.

E. Gunnii (Gunn's).* Cider-tree of Tasmania. *fl.* white; peduncles axillary, very short, each with three rather large almost sessile flowers. *l.* ovate-lanceolate or elliptical and obtuse to lanceolate-acute. A bush or small tree, sometimes attaining a height of 30ft. Perhaps the hardiest of all the species.

E. macrocarpa (large-fruited). *fl.* very large, solitary, on very short, thick, axillary peduncles. June. *l.* opposite, sessile, broadly cordate-ovate, acute or obtuse, often 6in. long, or even more, very thick and rigid. *h.* 6ft. to 10ft. 1842. A stout shrub, usually more or less mealy-white. In the "North" Gallery at Kew, there is a portrait of one of the few remaining specimens of this—one of the rarest of the Eucalypti. Although it has the largest flowers of all the species of the genus, it is only a shrub, and has been nearly extirpated by sheep in the one district where it was known to grow. (B. M. 4333; P. M. B. xv. 29.)

E. obliqua (oblique). Stringy-bark. *fl.*, peduncles axillary or lateral, and, as well as the branches, nearly terete; umbels four to eight-flowered. *l.* alternate, ovate-lanceolate, 4in. to 6in. long, acuminated, very unequal at the base. *h.* 150ft. to 250ft. The bark of this comes off in large slabs, and is used in making wigwams and roofs; and the natives also use it when they wish to cross a river. They strip off a large concave piece, and stop up the ends with mud, so as to keep the water out, thus forming a rude canoe, in which they paddle themselves over with a piece of wood, leaving it to rot or float away. SYN. *E. gigantea*. (H. F. T. i., 28.)

E. paniculata (panicled). *fl.*, peduncles angular; lower ones axillary; the rest disposed in a terminal panicle; petioles 5in. long. *l.* lanceolate, 3in. long, and five to six lines broad,

Eucalyptus—*continued.*

attenuated at the base. 1804. A large shrub or moderate-sized tree.

E. plurilocularis (many-celled). A synonym of *E. Preissiana.*

E. polyanthemos (many-flowered). *fl.* white, small, in umbels, shortly pedunculate, and usually several together in short oblong or corymbose panicles in the upper axils, or at the ends of the branches. *l.* on rather long petioles, broadly ovate-orbicular, or rhomboidal, obtuse, or rarely shortly acuminate, mostly under 3in. long, passing, in older trees, into ovate-lanceolate, obtuse, and 3in. long, or more, rather rigid, with fine diverging veins, the ultra-marginal ones distant from the edge. *h.* various, sometimes small, at others attaining 40ft. to 50ft. SYNS. *E. populifolia* and *E. populnea.*

E. populifolia (Poplar-leaved). A synonym of *E. polyanthemos.*

E. populnea (Poplar-like). A synonym of *E. polyanthemos.*

E. Preissiana (Preiss's). *fl.* yellow; peduncles axillary or lateral, very thick and much dilated, sometimes almost winged, under 1in. long, each with three large flowers, either sessile or tapering into a very short, thick, flattened pedicel. *l.* mostly opposite, although petiolate, from broadly ovate to ovate-lanceolate, very obtuse, or rarely acute, 3in. to 5in. long, very thick and rigid, the veins diverging and parallel, but not close, the marginal one at a distance from the edge. *h.* 8ft. to 12ft. A stout, rigid shrub. SYN. *E. plurilocularis.* (B. M. 4266.)

E. pulverulenta (powdery). *fl.*, peduncles axillary, very short, terete, or angular, each with three flowers not large, and sessile, or nearly so. June. *l.* sessile, opposite, cordate, orbicular or broadly ovate, obtuse, or almost acute, quite entire, more or less glaucous. A small tree. SYNS. *E. cordata* and *E. pulvigera.* (B. M. 2087.)

E. pulvigera (powdery). A synonym of *E. pulverulenta.*

E. robusta (robust). *fl.*, peduncles lateral and terminal, two-edged; pedicels short, compressed. *l.* alternate, ovate. *h.* 100ft. 1794. The variety *rostrata* has ovate-lanceolate acuminated leaves.

E. splachnicarpa (Splachnum-fruited). A synonym of *C. calophylla.*

E. tetragona (four-angled). *fl.* red; peduncles axillary, short, thick, angular or flattened, with three or more rather large flowers, on thick, angular, or flattened pedicels. July. *l.* mostly opposite, or nearly so, the upper ones alternate, from broadly ovate and very obtuse to lanceolate-falcate and almost acute, rarely more than 4in. long, thick and rigid, with diverging, but rather distant, veins. *h.* varying from a low scrubby shrub to a small tree of 20ft. to 25ft. 1824. SYN. *Eudesmia tetragona.* (S. F. A. 21.)

EUCHÆTIS (from *eu*, well, and *chaite*, hair; petals bearded inside). ORD. *Rutaceæ.* A genus of four or five species of greenhouse evergreen Heath-like shrubs, confined to South-western Africa. For cultivation, *see* **Diosma.**

E. glomerata (close-flowered). *fl.* white, glomerate at the tops of the branches; peduncles very short, bracteate. May. *l.* scattered, lanceolate, keeled, with a pellucid, rigidly, and ciliated margin. *h.* 2ft. Cape of Good Hope, 1818.

EUCHARIDIUM (from *eucharis*, agreeable; habit of plant). ORD. *Onagrarieæ.* A genus containing only a couple of species of very pretty hardy annuals, both Californian, extremely showy when grown in masses. Seeds may be sown in the open border, in spring or autumn. *E. Breweri* is probably not yet in cultivation.

E. concinnum neat).* *fl.* lilac-purple, solitary, on long pedicels; petals trilobate; sepals cohering at the tips, reflexed. Summer. *l.* glabrous, ovate-lanceolate, entire. *h.* 1ft. North America, 1787. (B. M. 3589.) *E. grandiflorum* (R. H. vi. 298) is merely a large-flowered variety of the above.

EUCHARIS (from *eu*, well, and *charis*, grace; very graceful, a manufactured name). ORD. *Amaryllideæ.* A small genus of tropical bulbous plants, from New Grenada. There are five species known, all of which are in cultivation, and three of them taking rank among the most popular of stove bulbous plants. For their cultivation, a temperature of 65deg. to 70deg., rising to 80deg. in summer; and, except for a few weeks in autumn, an abundance of water always will be found suitable. The soil should consist of two parts rich loam to one of leaf mould and manure, with the addition of charcoal, to keep it open. Rather large pots are best, so as to allow the roots to ramify freely, and they should be inserted deeply. Half-a-dozen strong bulbs in a 10in. pot will be suitable for *E. candida*, *E. grandiflora* (*amazonica*), and *E. Sanderiana*, whilst for the others a 6in. pot for the same number of bulbs will be ample. Where grown in large quantities, the bulbs may be planted out in beds beneath

Eucharis—*continued.*

which hot-water pipes are placed, though equally good results are obtainable if they are kept in pots and plunged in a tan or dung bed. If potted in good soil in the first instance, it will not be necessary to do more than top-dress the plants annually, repotting only when the bulbs are overcrowded. Liquid manure may be given with advantage, after the flower-scapes appear. If placed in an intermediate house whilst in flower, a longer display, and blossoms of better substance, will be the result. Offsets are developed rather freely by the bulbs when growing well, and if these be removed and potted up singly in 6in. pots, a good stock of plants may soon be obtained. After the leaves are all matured, less water, and a temperature a few degrees lower than that recommended for the growing period, will be necessary; always however, avoiding total drying off—treatment not essential to the free production of flowers, but likely to weaken the bulbs. When favourably situated, old-established plants of the above-named best kinds of Eucharis will bear two or three crops of flowers in the course of a year. Seeds are sometimes ripened on cultivated Eucharises, which may be sown as soon as ripe, in a warm house.

E. amazonica (Amazon). A synonym of *E. grandiflora.*

E. candida (white).* *fl.* pure white, drooping, 3in. broad; corona very prominent, divided into six pointed segments, to which the stamens are attached; umbel six to ten-flowered on scape 2ft. long. *l.* solitary on each bulb, broadly elliptic, acuminate; petiole long, compressed, 1ft. long. Bulb large as a hen's egg, with an elongated neck. New Grenada, 1851. (F. d. S. 788.)

E. candida (white). A garden name for *E. subedentata.*

E. c. grandiflora (large-flowered). A synonym of *E. grandiflora.*

E. grandiflora (large-flowered).* *fl.* pure white, drooping, 4in. to 5in. wide, borne in three to six-flowered umbels on erect scapes, about 2ft. long; corona tinged with green. *l.* several to a bulb, broadly ovate, acuminate, channelled, slightly waved and plaited; blade 8in., petiole 10in., long. Bulb egg-shaped, with a rather long neck. New Grenada, 1854. SYNS. *E. amazonica*, *E. candida grandiflora.* See Fig. 738. (B. M. 4971.)

E. Hartwegiana (Hartweg's). This species, already described in this work under **Caliphruria,** should now be placed here. (B. M. 6259.)

E. paradoxa (paradoxical). A synonym of *E. subedentata.*

E. Sanderiana (Sander's).* *fl.* pure white, with filaments and inside of tube yellow, about 3in. wide; corona suppressed; umbels three to seven-flowered, on erect scape, 18in. long. New Grenada, 1882. Habit and foliage of *D. grandiflora*, to which it may be compared also in the beauty and usefulness of its flowers. (B. M. 6676.)

E. subedentata (almost without teeth, in allusion to absence of corona). This is now the correct name of the plant described in this work as **Caliphruria subedentata.** SYNS. *E. candida* (of gardens) and *E. paradoxa.* (B. M. 6289.)

EUCHILUS. Included under **Pultenæa** (which *see*).

EUCHLÆNA (from *eu*, well, and *chlaina*, a mantle; in allusion to the large glumes). SYN. *Reana.* ORD. *Gramineæ.* Tropical fodder grasses, of annual duration. Male flowers in dense terminal panicles; females in axillary spikes. Leaves long, broad, strap-shaped. Stems tall, succulent.

E. luxurians (luxuriant). Teosinte. *fl.*, males on short axillary panicles; females in large terminal drooping panicles. *l.* 4ft. long, green, soft in texture. Stems 12ft. to 15ft. high, in tufts, as many as thirty stems springing from a single seed. Mexico. (B. M. 6414.)

EUCHROMA. Included under **Castilleja** (which *see*).

EUCLEA (from *eukleia*, glory; referring to the beauty of the ebony-like wood). SYN. *Diplonema.* ORD. *Ebenaceæ.* A genus containing some nineteen species of greenhouse evergreen shrubs, natives, for the most part, of the Cape of Good Hope. None are of any value from a purely horticultural standpoint. Flowers axillary, racemose, rarely paniculate or solitary. Leaves alternate or opposite, entire, oval-lanceolate or oblong, sometimes crisped or wavy. For culture, *see* **Diospyros.**

E. polyandra (many-stamened). *fl.* five to seven-fid, diœcious. June and July. *l.* elliptic, alternate or sub-opposite. *h.* 4ft. to 6ft. 1774. SYN. *Diplonema elliptica.*

EUCNIDE. Included under **Mentzelia** (which *see*).

EUCODONIA. This genus is now included under **Achimenes** (which *see*).

EUCOMIS (from *eukomes*, beautiful-haired; alluding to the tufted crown of the flower-spike). ORD. *Liliaceæ*.

FIG. 733. EUCHARIS GRANDIFLORA, showing Leaves and Inflorescence.

A genus of about half-a-dozen species of strong half-hardy bulbs, natives of the Cape of Good Hope. They have broad root leaves and a simple raceme of rather

Eucomis—*continued.*

large, usually greenish flowers, surmounted by a tuft of empty leaf-like bracts. Eucomis thrive in any rich soil, and are increased by offsets.

E. amaryllidifolia (Amaryllis-leaved). *fl.*, raceme oblong, dense, 2in. to 3in. long; perianth green, segments oblong; scape cylindrical, terete, under 1ft. long. August. *l.* contemporary with the flowers, sub-erect, fleshy in texture, lorate-ligulate, narrowed

Eucomis—*continued.*

gradually to the base, obtuse, quite unspotted upon either back or face, channelled down the face in the lower half. Bulb ovoid. Cape Colony, 1878.

E. bicolor (two-coloured).* *fl.*, raceme dense, oblong, 3in. to 4in. long; perianth segments pale green, with a sharp purple edge, oblong; scape terete, ½in. in diameter. August. *l.* sub-erect, oblong, unspotted, crisped towards the edge. Bulb globose, with copious fleshy root fibres. Natal, 1878. A handsome, robust-growing species.

E. bifolia (two-leaved). A synonym of *Whiteheadia bifolia.*

E. nana (dwarf).* *fl.* brown; scape clavate. May. *l.* broad-lanceolate, acute. *h.* 9in. 1774. (B. M. 1495.) *E. purpureo-caulis* (A. B. R. 369) is a form of this with a purple scape.

FIG. 739. EUCOMIS PUNCTATA, showing Habit and Single Flower.

E. punctata (spotted).* *fl.* green, brown; scape cylindrical. July. *l.* oblong-lanceolate, channelled, spreading. *h.* 2ft. 1783. See Fig. 739. (B. M. 913.)

E. p. striata (streaked). *fl.* green; scape cylindrical. June to December. *l.* lanceolate, spreading, striped. *h.* 2ft. 1790. (B. M. 1539.)

E. undulata (wavy). *fl.* green; scape cylindrical. March and April. *l.* ovate-oblong, wavy, spreading. *h.* 2ft. 1760. (B. M. 1083.)

EUCROSIA (from *eu*, good, and *krossos*, a fringe; in allusion to the beautiful fringe of the flower, formed by the cup of the stamens). ORD. *Amaryllideæ.* A very handsome greenhouse bulbous perennial. For culture, *see* **Pancratium.**

E. bicolor (two-coloured). *fl.* orange, ringent, nodding; umbellate. April. *h.* 1ft. Peru, 1816. Extremely rare. (B. M. 2490.)

EUCRYPHIA (from *eu*, well, and *kryphios*, covered; referring to the calyptra of the flower). ORD. *Rosaceæ.* A genus of three or four species of very handsome hardy evergreen or greenhouse shrubs or trees, of easy culture in a compost of loam and peat, and in a warm, sunny situation. Cuttings of young shoots will root in sand, if placed under glass.

E. Billardieri (Billardier's). *fl.* white, very showy, the broad petals often 1in. in diameter; peduncles much shorter than the leaves. *l.* simple, shortly petiolate, oblong, very obtuse, entire, coriaceous, glaucous or whitish underneath. Tasmania. A handsome greenhouse tree, attaining a very large size, although the smaller forms are often reduced to a bushy shrub. SYN. *Carpodontos lucida.*

E. cordifolia (heart-shaped-leaved). *fl.* white, large, axillary, solitary, stalked. *l.* cordate-oblong, crenated, downy. *h.* 20ft. Chili, 1851. Hardy.

E. pinnatifida (pinnatifid). *fl.* white, large, usually borne in pairs near the upper portions of the branches. *l.* pinnate, dark green. Chili, 1880. Hardy. (G. C. n. s., xiv. 337; Gn., Dec. 1877.)

EUDESMIA. Included under **Eucalyptus** (which *see*).

EUGENIA (named in honour of Prince Eugene of Savoy, who was a protector and promoter of botany, and possessed a botanic garden). Cambuy Fruit. Including *Jambosa* and *Syzygium.* ORD. *Myrtaceæ.* A large genus (about 700 species have been described) of stove and greenhouse evergreen trees or shrubs, with the general habit and inflorescence of **Myrtus** (which *see* for cultivation).

E. apiculata (apiculate). A synonym of *Myrtus Luma.*

E. australis (Southern). A synonym of *E. myrtifolia.*

E. brasiliensis (Brazilian). *fl.* white; pedicels one-flowered, slender, rising from the axils of the scaly leaves, along the branches, from velvety scaly buds. April. *l.* oval or obovate-oblong, bluntish, 3in. long, 1½in. broad. *h.* 6ft. Brazil. Stove. (B. M. 4526.)

E. buxifolia (Box-leaved). *fl.* white; peduncles axillary, branched, many-flowered, very short. May. *l.* obovate-oblong, obtuse, attenuated at the base, opaque, 1in. to 1½in. long. *h.* 4ft. to 6ft. West Indies, 1818. Stove.

E. fragrans. *See* **Myrtus fragrans.**

E. Jambos (Jambos). *fl.* white; racemes cymose, terminal. February to July. *fr.* white, red, or rose-coloured, about the size of a Medlar. *l.* narrow-lanceolate, attenuated at the base, acuminated at the apex. *h.* 20ft. to 30ft. East Indies, 1768. Stove. SYN. *Jambosa vulgaris.* (B. M. 1696.)

E. Luma. *See* **Myrtus Luma.**

E. Michelli (Michell's). *fl.* white; pedicels axillary, one-flowered, usually solitary, shorter than the leaves. *l.* ovate-lanceolate, glabrous. *h.* 12ft. Brazil. Stove.

E. myrtifolia (Myrtle-leaved). *fl.*, peduncles axillary, lateral or terminating short leafy shoots, bearing usually three or five flowers, sometimes more, in a loose, trichotomous panicle. *fr.* red, ovoid or nearly globular, crowned by the calyx limb. *l.* petiolate, varying from oval-oblong or almost obovate to oblong-elliptical or almost lanceolate, obtuse or acuminate, 2in. to 3in. long, cuneate or narrowed at the base, finely and almost transversely penniveined. *h.* 6ft. to 12ft. Queensland and New South Wales. A glabrous greenhouse shrub. SYNS. *E. australis* and *Jambosa australis.* (B. M. 2230.)

E. orbiculata (orbiculate). *fl.* white; peduncles single-flowered, axillary. November. *l.* nearly sessile, thick and coriaceous, very dark green. Mauritius, &c., 1824. Stove. (B. M. 4558, under name of *Myrtus orbiculata.*)

E. Pimenta. A synonym of *Pimenta vulgaris.*

E. Smithii (Smith's). *fl.* white, small, numerous, in a terminal trichotomous panicle, sometimes corymbose and shorter than the leaves, sometimes longer and more pyramidal. July. *fr.* white or purple, globular. *l.* petiolate, from ovate to ovate-oblong or ovate-lanceolate, obtuse or more or less acuminate, narrowed at the base, mostly 2in. to 3in. long, smooth, and finely penniveined. *h.* 8ft. New South Wales. A tree, sometimes small and slender, but attaining in some places a considerable height; quite glabrous. Greenhouse. (B. M. 1872, under name of *E. elliptica.*)

E. Ugni. *See* **Myrtus Ugni.**

EULALIA (from *eu*, well, and *lalia*, speech; in reference to the high reputation of the plants). ORD. *Gramineæ.* The very ornamental hardy grass described below should properly be referred to the genus *Miscanthus.* The varieties are well suited for growing in large pots or tubs in unheated conservatories; they also form excellent border plants in any good ordinary soil. Increased freely by divisions.

E. japonica (Japanese). *fl.* purplish, in panicles 8in. to 12in. long. *l.* linear-lanceolate, 3ft. in. length, deep green in colour. Japan.

E. j. foliis striatis (striated-leaved).* *l.* with a creamy band running through the centre of each.

E. j. zebrina (zebra-leaved).* A very handsome form, with leaves having bars of yellow running crosswise, not longitudinally, as in the foregoing variety. See Fig. 740.

EULOPHIA (from *eulophos*, handsome-crested; referring to the handsome labellum or lip, which is furrowed into elevated ridges). ORD. *Orchideæ.* A numerous genus of stove terrestrial orchids, a few of which are pretty. Flower-scapes either simple or branched, bearing few or many flowers; sepals and petals nearly equal; lip pouched or spurred, with an entire or trilobed limb, bearded or crested in the middle. Leaves grassy, or lance-shaped and plaited. For culture, *see* **Calanthe.**

E. Dregiana (Drege's). *fl.* produced on spikes sepals; and petals chocolate-colour; lip white. Cape of Good Hope.

Eulophia—*continued.*

E. euglossa (pretty-lipped). *fl.*, sepals and petals green, lanceolate, acuminate, nearly equal, spreading; lip trifid; lateral segments semi-ovate, acute, greenish-yellow; middle segment semi-oblong, acute, somewhat crisp, white, with some radiating purple streaks on the base; spur clavate, green. *l.* cuneate-oblong, acute, 1ft. long. Old Calabar, 1866. A rather curious plant, requiring plenty of heat to flower it successfully. (B. M. 5561.)

E. guineensis (Guinea). *fl.* whitish-pink; lip membranous, complete; spur ascending. May to November. *l.* lanceolate, nerved. *h.* 1ft. Sierra Leone, 1822.

E. Helleborina (Helleborine). *See* **Habenaria Helleborina.**

E. macrostachya (large-spiked). *fl.* shortly pedicellate, 1in. in diameter across the lateral sepals, erecto-patent; lip very concave, golden-yellow, with red-purple stripes on the disk, broader than long, obtusely shallowly three-lobed. January. *l.* about two, from the top of the pseudo-bulb, oblong-lanceolate, acuminate, contracted into a petiole, membranous, plaited, about three-ribbed. Pseudo-bulbs elongate, conical, terete, striated. Ceylon, 1837. A very desirable plant, on account of its late flowering. (B. M. 6246.)

E. virens (greenish). *fl.*, sepals and petals yellowish-green, tessellated with brown lines, nearly equal, oblong, bluntly pointed, narrowed at base; lip longer than the petals, white, with purple streaks, three-lobed, the lateral ones being shortened, and the central one crisp at margin, obtuse and recurved at apex, and furnished with rows of dark hairs along its disk; spur short, conical. Pseudo-bulbs roundish-ovate, 2in. to 3in. long, bearing several narrow grassy leaves. Ceylon, 1866. (B. M. 5579.)

EUNOMIA (from *eu*, well, and *nomos*, order; the leaves opposite, and seeds twin). ORD. *Cruciferæ.* This genus contains a couple of species (both natives of the mountainous regions of Asia Minor) of very pretty little half-hardy evergreen sub-shrubs, admirably adapted for rockwork. Increased by cuttings, placed under a glass, in summer; or by seeds, sown in a similar situation, in spring.

Eunomia—*continued.*

E. oppositifolia (opposite-leaved). *fl.* white; racemes ten or twelve-flowered, terminal. June. *l.* opposite, almost orbicular, entire, smooth. Stem decumbent, branched. *h.* 6in. to 12in. 1827.

EUONYMUS (*Euonomon*, the name given to this plant by Theophrastus, from *eu*, good, and *onoma*, a name). Spindle-tree. ORD. *Celastrineæ.* A genus of interesting hardy or half-hardy, deciduous or evergreen, trees or shrubs. Flowers small, often greenish or purplish; peduncles axillary. Leaves opposite, petiolate, entire, or serrate. Branches terete. They are of very easy culture in any ordinary garden soil, and form excellent subjects for low, close fences, or shrubberies. The species with variegated leaves are well suited as edgings to large beds. Propagated readily by cuttings, about 3in. in length, of the last season's growth; these should be inserted in a fine compost of loam and sand, in early autumn.

E. americanus (American). Burning Bush; Strawberry Bush. *fl.* greenish-purple; petals nearly orbicular; peduncles one to three flowered. June. *fr.* scarlet. *l.* ovate to oblong-lanceolate, acute,

FIG. 740. EULALIA JAPONICA ZEBRINA, showing Foliage, and Fully-expanded and Young Inflorescences.

Euonymus—*continued.*

serrated, almost sessile. Branches smooth, quadrangular. *h.* 2ft. to 6ft. North America, 1686. Hardy deciduous. (A. F. B. ii. 499.)

E. atropurpureus (dark-purple).* Burning Bush; Waahoo. *fl.* dark-purple, quadrifid; petals orbicular; peduncles many-flowered, compressed. June. *l.* oval-oblong, acuminate, serrated, stalked. Branches smooth. *h.* 6ft. to 14ft. North America, 1756. Hardy deciduous. (A. F. B. ii. 499.)

E. europæus (European).* *fl.* greenish-white, small, fœtid; petals oblong, acute; peduncles usually three-flowered. May. *l.* ovate-lanceolate, finely serrated. Branches smooth. *h.* 6ft. to 20ft. West Asia, Europe (Britain), &c. Hardy deciduous. (Sy. En. B. 317.)

E. fimbriatus (fimbriate).* *fl.* white, sub-umbellate, on long filiform peduncles. *l.* ovate, acuminate, fringed with long, parallel, toothed serratures. Branches terete, smooth. *h.* 12ft. Japan, India, &c. Half-hardy evergreen. (F. d. S. 1851, 71.)

E. grandiflorus (large-flowered). *fl.* white, very large, slightly nodding, inodorous; petals orbicular, flat, with curled edges; peduncles slender, flattened, three to six-flowered. April. *l.* ovate-oblong, obtuse, acutely-serrulate, with a tapering, entire base. Branches slightly four-cornered. *h.* 10ft. Nepaul, 1824. Half-hardy evergreen.

E. Hamiltonianus (Hamilton's). *fl.* white; petals lanceolate, cordate, with revolute edges; peduncles dichotomous, six-flowered. April. *l.* lanceolate, finely serrated. Branches smooth, terete. *h.* 5ft. to 20ft. Temperate Himalaya, Japan, 1825. Half-hardy evergreen. (B. F. F. 16.)

E. japonicus (Japanese).* *fl.* white, small; petals orbicular, fringed; peduncles flattened, crowded and panicled on the recent shoots, two or three times dichotomous, many-flowered. April. *l.* oblong, sharply serrulated, acuminated. Branchlets pendulous, slightly compressed. *h.* 20ft. Nepaul, 1804. Half-hardy in the northern counties of England. Evergreen. There are several handsomely variegated forms of this species, the names of which indicate the markings: *albo-marginatis, aureo-marginatus, latifolius-albus, latifolius-aureus,* &c. *E. radicans,* a small decumbent shrub, with oblong or orbicular serrated leaves, is a form of *E. japonicus*; it also has several highly ornamental variegated sub-varieties.

E. latifolius (broad-leaved). *fl.* white at first, but becoming purplish as they fade; petals oval, ovate; peduncles trichotomous, many-flowered. June. *l.* broad, ovate, toothleted. Branches smooth. *h.* 6ft. to 8ft. Europe, &c., 1863. Hardy deciduous. (B. M. 2384.)

E. verrucosus (warty-branched). *fl.* greenish-white or greenish-yellow, small; petals ovate; peduncles three-flowered. May. *l.* somewhat ovate. Branches warted. *h.* 10ft. to 20ft. Europe, 1730. Hardy deciduous. (J. F. A. 1, 49.)

EUPATORIUM (*Eupatorion* is a name used by Dioscorides and it is said by Pliny to have been so called after Mithridates Eupator, king of Pontus, who discovered one of the species to be an antidote against poison). Including *Bulbostylis, Conoclinium,* and *Hebeclinium.* ORD. *Compositæ.* A large genus of stove, greenhouse, or hardy, herbaceous or shrubby plants, many of which are very ornamental, whilst others are of no horticultural value. There are upwards of 400 species, most of which are American; they are rarer in the Old World. Flower-heads purplish, bluish or white, in terminal corymbs; receptacle naked; pappus rough, two-sexual; involucral bracts imbricate, two to three-seriate; florets all tubular, five-fid. Leaves opposite or rarely alternate, entire, dentate, or rarely dissected. Some of the hardy sorts form excellent border plants, and are of very easy culture in ordinary garden soil. These are propagated by division. *E. atrorubens* and *E. ianthinum* are distinct and useful winter-flowering plants, that require a warm greenhouse temperature. Cuttings of the young shoots strike easily in spring, if placed in heat, in a close frame. If grown on throughout the summer without being stopped, a large terminal flower-head will be produced by each the following winter. A house with a temperature of 50deg. to 55deg. will suit them when in flower, but this should be maintained, as the plants soon droop if exposed to cold. If pruned back annually after flowering, and repotted, large bushes may, in course of time, be formed. *E. atrorubens* grows the more vigorous of the two, and the flowers are darker than those of *E. ianthinum,* which is, however, a good old species, well worth attention. Both are generally known as Hebecliniums. The cool greenhouse species are readily increased by cuttings, inserted in spring. *E. Weinmannianum* is

Eupatorium—*continued.*

somewhat shrubby, and may be grown for several years if pruned in a little after flowering. It is a very useful subject for decorating or for cut flowers, in early autumn and winter. *E. riparium* continues the flowering period; and, as this grows rapidly, it is best to propagate each year. Any frame where plenty of air can be admitted, is suitable for it in summer, and a house where frost is merely excluded, is warm enough in winter. If placed in heat, the plants soon become weak and drawn. This species is slender-growing, and has a much finer appearance when three plants are placed in an 8in. pot, and the growths tied out with small stakes. The most suitable soil for the greenhouse Eupatoriums is a rich compost of loam and dried cow-manure, in about equal parts. Plenty of water is necessary at all seasons, and artificial or liquid manure may be used with advantage after the flower-heads appear.

E. ageratoides (Ageratum-like). *fl.-heads* pure white, numerous; corymbs compound, twelve to twenty-flowered. Summer. *l.* opposite, ovate, or somewhat cordate, stalked, coarsely toothed. *h.* 1ft. to 4ft. Plant branching. North America, 1640. Hardy herbaceous.

E. aromaticum (aromatic). *fl.-heads* white; corymbs loose, eight to twenty-flowered. Late summer. *l.* opposite, usually very shortly stalked, rounded, toothed. *h.* 3ft. to 4ft. North America, 1739. A strong-growing, variable, hardy species.

E. atrorubens (dark-red).* *fl.-heads* reddish, shaded with lilac, numerous. Autumn, winter. *l.* large, opposite, somewhat ovate, toothed. Mexico, 1862. A very neat and useful greenhouse species. SYN. *Hebeclinium atrorubens.* (I. H. 1862, 310.)

E. cannabinum. Hemp Agrimony. *fl.-heads* reddish-purple, in terminal tufts. July. *l.* three to five-foliate; leaflets lanceolate, serrate. *h.* 2ft. to 4ft. Stems erect, sub-simple, downy. Asia, Europe (Britain), &c. A very handsome native perennial, and one of the best of hardy species. (Sy. En. B. 785.)

E. Haageanum (Haage's). *fl.-heads* white, small, in loose corymbs. *l.* opposite, ovate, acuminate, coarsely serrated. South America, 1857. An erect shrubby greenhouse plant.

E. ianthinum (violet).* *fl.-heads* purple, produced in very large terminal corymbs. Winter. *l.* large, ovate, soft, deeply serrate at the edges. *h.* 3ft. Mexico, 1849. A very useful greenhouse, winter-flowering plant. SYN. *Hebeclinium ianthinum.* (B. M. 4574.)

E. macrophyllum (large-leaved). *fl.-heads* reddish-lilac, produced in large corymbs, in great profusion. Autumn, winter. *l.* large, cordate, dark green. *h.* 4ft. Tropical America, 1823. A very large greenhouse species, allied to the last-named. SYN. *Hebeclinium macrophyllum.* (R. H. 1866, 42.)

E. purpureum (purple). *fl.-heads* purplish; corymbs five to nine-flowered. Autumn. *l.* three to six in a whorl, somewhat ovate, or lanceolate, acuminated, rough, unequally toothed, downy beneath. *h.* 3ft. to 9ft. Hardy. North America, 1640.

E. riparium (river-bank).* *fl.-heads* white, numerously disposed in a panicle of terminal and axillary corymbs. Spring. *l.* oblong-lanceolate, deeply toothed. South America, 1867. A very desirable greenhouse plant. (R. G. 525.)

E. Weinmannianum (Weinmann's).* *fl.-heads* white, sweet-scented, large, corymbose. Autumn and winter. *l.* opposite, elliptic-lanceolate. South America, 1867. An elegant fragrant greenhouse plant. (G. C. n. s., v. 53.)

EUPHORBIA (a name given to this plant by Dioscorides; said by Pliny to have been so called in honour of Euphorbus, physician to Juba, King of Mauritania). Milkwort or Spurge. SYN. *Tithymalus.* Including *Poinsettia* and *Treisia.* ORD. *Euphorbiaceæ.* A genus comprising about 600 species of stove, greenhouse, or hardy, trees, shrubs, and herbs. The flowers are unisexual, collected into heads; these flower-heads are placed in umbels variously branched, or aggregated into clusters round the top of the stem. Only a very few plants of this genus are worth growing for horticultural purposes. The few hardy species of ornamental value make excellent border plants, and are fit subjects for naturalising on rocky, somewhat dry situations. These may be increased by cuttings, or by division. Two largely grown stove species, that are among the best and most showy of winter-flowering plants, are *E. fulgens* and *E. pulcherrima* (the latter is better known under the name of *Poinsettia pulcherrima*). Another, which is frequently represented in gardens by one or more plants,

Euphorbia—*continued.*

is *E. splendens.* The last is nearly always, more or less, in flower; and, although very ornamental, is not of much use, except to remain in the stove. Slow-growing Euphorbias, which are kept for the sake of their addition to a collection of succulent plants, do not require much water, nor a rich soil to grow in. Sandy loam and crushed pieces of brick, in nearly equal proportions, form a suitable compost. *E. fulgens* is a somewhat slender-growing plant, and is frequently found rather difficult to establish. It succeeds well planted out in the warmest part of a stove, and trained up the back wall or on the roof. It has also been found to grow and flower profusely in a house with Pines, the moisture in summer and drier heat in winter, suiting admirably. It is very impatient of root disturbance, and will not bear sudden changes of temperature without losing its leaves. For culture in pots, young plants may be raised annually. Cuttings 3in. long are best; they should be inserted about June, three in a small pot, and kept close in a warm propagating frame until rooted. These may be afterwards kept growing in heat, and transferred bodily into larger pots, without disturbing the roots. If treated in this way, they need not be stopped, and the single shoots will consequently be much stronger. The plants will not bear cold at any time, but will succeed in frames during the latter part of summer. The flowers are small, produced all along the upper part of the shoots in winter, so that the ripening of the latter by exposure to sun, is important. If kept a little cooler when in flower, they last a long time in beauty, and may be used for cutting, although the leaves frequently droop very quickly. When flowering is over, the plants should be kept quite dry and allowed to rest for a period of three or four months. As is the case with nearly all the species, the beauty of *E. pulcherrima* does not reside so much in the flowers as in the bracts with which they are surrounded. The system of culture is much the same as with the species already described, but varies in some respects, as the plants are much stronger-growing. Any old ones that have been resting should be introduced to heat about the beginning of June, and, if kept watered, will soon supply plenty of cuttings. These are best inserted singly in small pots, without crocks, in order to preserve the roots afterwards. The best summer quarters is on a spent hotbed, where the tops can be kept near the glass at all times, being lowered, as becomes necessary, by the removal of the manure underneath. It is advisable to put in several batches of cuttings successionally, as plants of various heights may then be obtained. The general plan is to grow on young ones annually, without stopping, the object being to produce a large terminal head of bracts on each. The old plants may also be grown if desired. They will not bear exposure to a low temperature in autumn, the result being invariably the loss of either the roots or leaves. When the bracts appear, more heat and some manure water may be applied, to expand them, and the plants should afterwards be kept a little cooler, to prolong the season in which they remain attractive. *E. pulcherrima* succeeds best in a soil composed of one-half turfy loam, the remainder being equal parts of dried cow-manure and leaf soil. Pots 5in. to 7in. in diameter are suitable for single plants to flower in. Retaining the foliage in good condition throughout the season, is an indication of good culture, and one of the main provisions for securing the full development of the flower-heads. Sudden

Euphorbia—*continued.*

changes of temperature in either direction must be avoided, and the plants exposed to plenty of light and full sunshine, except when it is very strong, in summer. After flowering, they should be kept quite dry, in a warm place, to supply cuttings the next year.

E. atropurpurea (dark-purple). *fl.* (= bracts) deep red-purple, or blood-coloured, large, broadly oblong, obtuse, combined at the base; involucre small, cup-shaped, red, with four retuse, fleshy yellow-green glands at the margin. March. *l.* numerous, lanceolate, tapering at the base, obtuse, pale glaucous-green, patent or drooping. *h.* 3ft. to 6ft. Teneriffe. A very pretty greenhouse species. (B. M. 3321.)

E. Cyparissias (Cypress Spurge). *fl.* yellow, umbellate; involucral leaves somewhat cordate, about twenty in number, often yellow. Spring. *l.* linear, quite entire, somewhat crowded. *h.* 1ft. to 2ft. Europe (naturalised in Britain). Hardy. (Sy. En. B. 1262.)

E. fulgens (shining). *fl.*, bracts bright orange-scarlet, axillary, forming long wreaths. *l.* bright green, lanceolate. *h.* 4ft. Mexico, 1836. Stove. One of the handsomest of winter-flowering plants. SYN. *E. jacquiniæflora.* (B. M. 3673.)

E. jacquiniæflora (Jacquinia-flowered). Synonymous with *E. fulgens.*

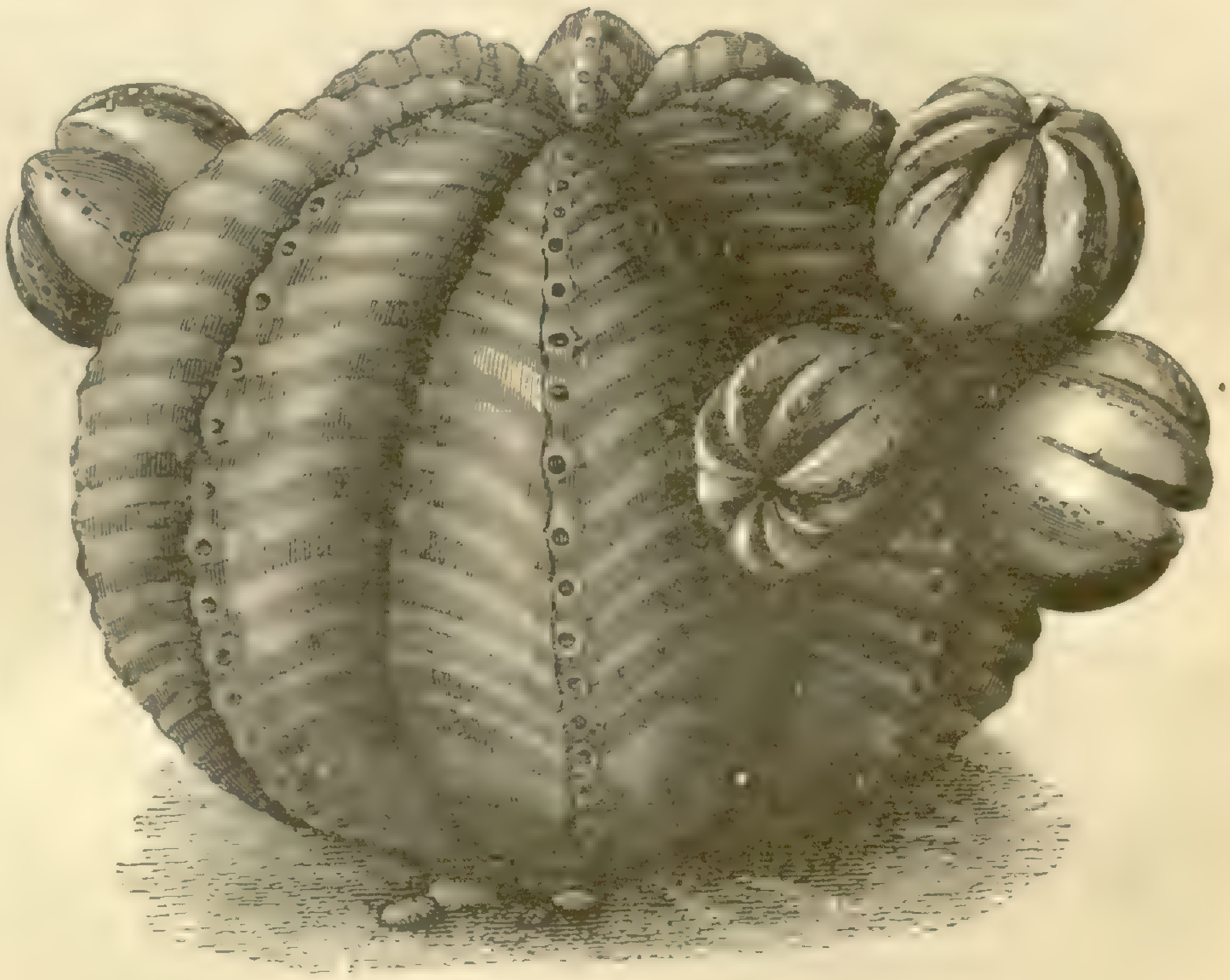


FIG. 741. EUPHORBIA MELOFORMIS.

E. meloformis (Melon-like). *fl.* greenish. Plant unarmed, with many angles. *h.* 6in. to 9in. Cape of Good Hope, 1774. Stove or warm greenhouse. See Fig. 741.

E. Monteiri (Monteiro's). *fl.* green; involucre sub-regular campanulate, turbinate, or hemispherical. June. *l.* fleshy, glabrous, narrow, spathulate. Branchlets floriferous. *h.* 2ft. to 6ft. Bahia, 1864. A very remarkable species, on account of the curious successive productions of the staminate flowers. Stove. (B. M. 5534.)

E. Myrsinites (Myrsinites). *fl.* yellow, in an umbel of from five to nine rays, surrounded by an involucre of ovate, sharp leaflets. Summer. *l.* fleshy, concave, light green, sessile. South Europe. A very ornamental hardy prostrate species. (S. F. G. 471.)

E. pulcherrima (pretty). *fl.* greenish-yellow, subtended by large vermilion bracts, small. Winter. *l.* ovate-elliptical, sub-acute, petioled. *h.* 2ft. to 6ft. Mexico, 1834. Shrub. SYN. *Poinsettia pulcherrima.* (B. M. 3493.) There is a variety of this with creamy-white bracts, and another (*E. p. plenissima*) with double series of bracts (G. C. n. s., v. 17).

E. splendens (splendid). *fl.*, bracts bright red, waxy, clustered. *l.* bright green, texture thin, rather small. Stems dark-coloured, closely set with long, stout, sharp thorns. *h.* 4ft. Bourbon, 1826. A handsome stove species, with sturdy branching habit.

Several hardy species of *Euphorbia*, now almost lost to our gardens, are well worth culture. Among these may be mentioned *aleppica*, with dense terminal heads of flowers, and crowded linear-oblong leaves; *Characias*, with the flower-stalks equal in length and verticillate; *pilosa*, with dense terminal tufts of greenish-yellow flower-heads, and linear-oblong leaves. Among the species indigenous to this country, *amygdaloides* and *Paralias*

Euphorbia—*continued.*

are well worthy a place in the wild garden, and in the margins of shrubberies.

The following is a list of species sometimes grown in company with succulent plants: *abyssinica, anacantha, antiquorum, aphylla, canariensis, capensis, Caput-Medusæ, erosa, globosa, grandicornis, grandidens, hystrix, imbricata, mammillaris, mauritanica, neriifolia, officinarum, pendula, resinifera, scolopendria, serpens, squarrosa, trigona, xylophylloides.*

EUPHORBIACEÆ. A very large order of trees, shrubs, or herbs, usually abounding in milky juice. The species are found in all except Arctic climates. Flowers one-sexual, bracteate or involucrate, sometimes achlamydeous. Leaves opposite or alternate, simple, often stipulate. Well-known genera are: *Euphorbia, Jatropha, Ricinus,* and *Phyllanthus.* There are about 200 genera and 3000 species.

EUPHRASIA (from *euphraino*, to delight; plants supposed to cure blindness). Eyebright. ORD. *Scrophularineæ.* Dwarf herbs. Flowers white, yellow, or purple, in dense, secund, or interrupted bracteate spikes. Leaves opposite, toothed or cut. About twenty species belong to this genus, but none are of sufficient horticultural value to merit mention here.

EUPODIUM. *See* **Marattia.**

EUPOMATIA (from *eu*, well, and *poma*, a lid; calyptra covering the flower before expansion, in the manner of an extinguisher). ORD. *Anonaceæ.* This exclusively Australian genus contains a couple of species of fine greenhouse evergreen shrubs. Peduncles short, one-flowered, terminal or lateral. Leaves alternate, entire, shortly petiolate. They thrive in a compost of sandy peat and fibry loam. Cuttings of ripened shoots will root in sandy soil, if placed under a hand glass.

E. Bennettii (Bennett's). *fl.* solitary, terminal, on a short peduncle above the last leaf, when fully expanded rather more than 1in. in diameter. *l.* oblong-lanceolate, acuminate, or acute, 3in. to 5in. long, narrowed at the base into a short petiole, which is again enlarged at the base, and shortly decurrent on the stem, leaving oblique raised lines when they fall off. *h.* 1ft. to 2ft. (B. M. 4848, under name of *E. laurina.*)

E. laurina (Laurel-like). *fl.* greenish-yellow; peduncles one-flowered, axillary. *l.* oblong, coriaceous. *h.* 4ft. 1824.

EURYA (from *eurys*, large; wrongly applied to the flowers, which are comparatively small). SYN. *Geeria.* ORD. *Ternströmiaceæ.* Above thirty forms belonging to this genus have been described, but probably not more than ten or a dozen are specifically distinct, the rest being merely varieties, mostly of *E. japonica.* They are very ornamental half-hardy or greenhouse evergreen shrubs, with axillary pedicels. All are natives of Japan, China, the Indian Archipelago, &c. Euryas are of easy culture, in peat or leaf soil. Cuttings, made from the ends of the young shoots, root freely in sandy soil, in a gentle heat. When rooted, insert them in small pots, in either peaty or loamy soil, and again place in heat, where they can have the benefit of a good syringing, to encourage quick growth, and get them well established. The variegated form given below is one of the most useful plants for conservatory, hall, or corridor decoration, especially during winter.

E. japonica (Japanese). *fl.* greenish-white, generally in clusters of from three to six. *l.* very variable, in the type ovate, attenuated. Japan. A half-hardy evergreen shrub.

E. j. latifolia variegata (variegated broad-leaved).* *fl.* white, small, on axillary fascicled peduncles. *l.* variegated with pale yellow, glabrous, entire, oblong-lanceolate, obtusely-acuminate. Japan, 1871.

EURYALE (mythological: *Euryale*, one of the Gorgons, represented with fierce thorny locks; in allusion to the thorny nature of the plant). ORD. *Nymphaceæ.* An annual stove aquatic. Before the introduction of the Victoria Water-lily, the Euryale was the noblest aquatic plant in cultivation. Its leaves are circular in form, about 2ft. in diameter, with prominent spiny veins on the rich purple under side, the upper side being olive-green, puckered and spiny. For cultivation, *see* stove species of **Nymphæa.**

E. ferox (fierce).* *fl.* deep violet; petioles and calyces covered with stiff prickles. September. *l.* large, peltate. East Indies, 1809. Reproduces itself freely by means of seeds, which ripen on the plant and germinate at once, if not kept dry. (B. M. 1447.)

EURYBIA. *See* **Olearia.**

EURYCLES (from *eurys*, broad, and *kleio*, to close up; referring to form of flower, the cup of which is frequently imperfect). SYN. *Proiphys.* ORD. *Amaryllideæ.* Handsome, bulbous plants, allied to *Pancratium. E. amboinensis* requires stove treatment; the second, and only other, species thrives in a warm greenhouse. After growth is completed, water should be withheld for a few weeks, so that the bulbs may ripen and rest.

E. amboinensis (Amboyna). *fl.* white, produced in a many-flowered umbel, supported by a stout scape; perianth with a cylindrical tube and regular limb of equal segments; stigma simple; corona not one-fourth as long as the perianth lobes. March. *l.* very broad, cordate. *h.* 1ft. to 2ft. Amboyna, 1759. SYNS. *E. australasica, Pancratium amboinense* (B. M. 1419), and *P. australasica.*

E. australasica (Australian). A synonym of *E. amboinensis.*

FIG. 742. EURYCLES CUNNINGHAMI.

E. Cunninghami (Cunningham's).* Brisbane Lily. *fl.* white; umbels less crowded than in *E. amboinensis*; stigma three lobed; corona two-thirds as long as the perianth lobes. *l.* ovate, not cordate. *h.* 1ft. Queensland. See Fig. 742. (B. M. 3393.)

EURYGANIA (from *eurys*, wide, and *ganos*, brightness; Eurygania was a wife of Œdipus). ORD. *Vacciniaceæ.* A genus of about a dozen species of ornamental greenhouse evergreen shrubs, with pendent branches, allied to **Thibaudia** (which *see* for cultivation). All are natives of the Andes of South America.

E. ovata (ovate). *fl.* in very spreading, shortly peduncled, axillary corymbs, 4in. to 5in. across; calyx deep red; corolla urn-shaped, red; mouth whitish. July. *l.* ovate-acute, serrulate, 1in. to 1½in. long. Stem stout; branches long, rambling, cylindric, green. 1878.

EUSCAPHIS (from *eu*, well, and *skaphis*, a bowl; in allusion to the persistent, bowl-like calyx). ORD. *Sapindaceæ*. A genus containing two species of hardy, glabrous shrubs, natives of Japan. Flowers small, hermaphrodite; calyx persistent, five-cleft, imbricate. Leaves opposite, stipulate, imparipinnate; leaflets coriaceous, serrulate, stipulate; stipules deciduous. The species will thrive in any good loamy soil, in the ordinary shrubbery border. Propagated by seeds, or by cuttings.

E. staphyleoides (Staphylea-like). *fl.* white or yellowish, small, numerous, disposed in terminal panicles. *fr.* red when ripe, bladdery, remaining on the bush until winter approaches. *l.* opposite, pinnate, smooth. *h.* 10ft. to 12ft. This plant is highly prized in its native country for its medicinal properties. (S. Z. F. J. 67.)

EUSTEGIA (from *eu*, well, and *stego*, to cover; in reference to the triple corona). ORD. *Asclepiadeæ*. A genus containing four species of dwarf, decumbent, glabrous, greenhouse herbs, all natives of Southern Africa. Flowers small, in few-flowered, terminal or axillary cymes. Leaves opposite, linear, often hastate. For culture, *see* **Ceropegia.**

E. hastata (hastate). *fl.* white, sub-umbellate; umbels interpetiolar; corolla rotate; corona triple, each composed of five leaves. June. *l.* opposite, hastate, ciliated. 1816.

EUSTOMA (from *eustomos*, of beautiful countenance, *eu*, well, and *stoma*, a mouth; referring to the corollas). SYN. *Arenbergia*. ORD. *Gentianeæ*. A genus containing only the two species here described. Flowers white, purplish, or blue, pedunculate. Leaves opposite, amplexicaul or sessile. The species are elegant little plants, closely allied to **Lisianthus** (which *see* for culture).

E. exaltatum (exalted). *fl.* purple, corymbose; corolla with a funnel-shaped tube, which is contracted above the apex; segments crenated. July. *l.* spathulate. *h.* 2ft. South United States, 1804. Greenhouse herbaceous. (B. R. xxxi. 13.)

E. Russellianum (Russell's). *fl.* lavender-purple, corymbose. July. *l.* ovate to lanceolate-oblong. Stem terete. *h.* 1ft. to 2ft. Nebraska to Texas, 1804. Hardy annual. (B. M. 3626.)

EUSTREPHUS (from *eu*, good, and *strepho*, to twine; referring to the habit of the plant). ORD. *Liliaceæ*. A monotypic genus. For culture, *see* **Dianella.**

E. latifolius (broad-leaved). *fl.* pale purple; pedicels two to six together in the upper cells, filiform, but rigid, four to nine lines long, articulate close under the flower, and persistent. June. *l.* sessile, or nearly so, varying from broadly ovate-lanceolate to narrow-linear, usually tapering to a point, of a firm texture, with numerous fine but prominent nerves, usually 2in. to 4in. long. Stems much branched, often climbing to a great height, weak and flexuose, but not twining. New South Wales. (B. M. 1245.)

EUTAXIA (from *eutaxia*, modesty; in allusion to the delicate and modest appearance of the plants when in flower). ORD. *Leguminosæ*. A genus of eight species of elegant, greenhouse, evergreen shrubs, all natives of Australia. Flowers golden, simple. Leaves opposite, decussate. For culture, *see* **Chorizema.** *Sclerothamnus* is included, by Bentham and Hooker, under this genus.

E. empetrifolia (Empetrum-leaved). The correct name of plant described as *Sclerothamnus empetrifolia*.

E. myrtifolia (Myrtle-leaved).* *fl.* numerous along the branches; pedicels axillary, twin. August. *l.* lanceolate or obovate-lanceolate, mucronate. *h.* 2ft. to 6ft. 1803. (B. M. 1274.)

E. pungens (stinging). A synonym of *Dillwynia pungens*.

EUTERPE (mythological: *Euterpe*, from *euterpes*, well-pleasing, was one of the nine Muses). ORD. *Palmæ*. A small genus of about eight species of tall-growing, elegant, unarmed, stove palms, natives of tropical America and the West Indian Islands. Leaves pinnatisect; segments narrowly linear-lanceolate; leaf-sheaths long, cylindrical, pale green, "finally falling away completely along with the rest of the leaf, so that the stems always appear clean and naked up to the base of the lowest remaining leaf, forming a striking contrast to many fan-shaped Palms, where the leaves hang about the crown of the tree in every state of decay." To be grown to perfection, Euterpes should have plenty of heat, and a rich, loamy soil. They attain a height of from 40ft. to 120ft. in their native habitats.

Euterpe—*continued.*

E. edulis (edible). *l.*, segments lanceolate, acuminate; rachis and nerves scaly beneath. Trunk cylindric, 40ft. to 100ft. high. Brazil, &c.

E. montana (mountain). *l.*, segments lanceolate, spreading, attenuated; petioles scaly beneath. Stem 40ft. or more high. The portion of the plant (in this and other species) which is eaten, either as a fresh vegetable or as a pickle, is the terminal bud and the soft interior part of the stem.

E. oleracea (culinary). Cabbage Palm; Cabbage-tree. *l.*, segments lanceolate-linear, acuminate, glabrescent. Spadix branches furfuraceous, tomentose. Trunk 80ft. to 120ft. high. West Indies, &c.

EUTHALES. Included under **Velleia** (which *see*).

EUTOCA. A synonym of **Phacelia** (which *see*).

EUXENIA. A synonym of **Podanthus** (which *see*).

EVALLARIA. A synonym of **Polygonatum** (which *see*).

EVELYNA. A synonym of **Elleanthus** (which *see*).

EVENING FLOWER. *See* **Hesperantha.**

EVENING PRIMROSE. *See* **Œnothera.**

EVERGREEN BEECH. *See* **Fagus betuloides.**

EVERGREEN LABURNUM. *See* **Piptanthus nepalensis.**

EVERGREEN OAK. *See* **Quercus Ilex.**

EVERGREEN THORN. *See* **Cratægus Pyracantha.**

EVERLASTING PEA. *See* **Lathyrus sylvestris platyphyllus.**

EVERLASTINGS. This term is applied to a section of flowers with coloured bracts that retain a

FIG. 743. BUNCH OF EVERLASTING FLOWERS—HELICHRYSUMS.

Everlastings—*continued.*

considerable portion of their beauty for a long time after being cut and dried. In addition, many are among the best of ornamental plants, either cultivated in pots or in the open ground. The principal genera that supply flowers suitable as Everlastings are: *Acroclinium*, *Aphelexis*, *Helichrysum*, *Rhodanthe*, *Waitzia*, and *Xeranthemum*. The title is more particularly applied to the many highly-coloured varieties of *Helichrysum bracteatum*. These are termed Immortelles by the French, and are more largely used by them than in this country. To obtain them in the best condition, they should be gathered on a dry day, when each flower-head is sufficiently open to show the inside of the bracts without exposing the centre. If frequently examined, the whole stock may be secured in this condition. They should be hung, head downwards, in a cool shed, and allowed to remain until dry. The individual flower-heads may be wired, and used, with good effect, among dried ornamental grasses, in winter, either in high glasses or vases. The French use large quantities to form memorial wreaths and crosses. If properly gathered and dried, many of the species will keep good, excepting that some of the colour vanishes, for two or three years. A new stock, is, however best grown and collected each year. A bunch of Helichrysums, showing the proper stage for gathering, is represented in Fig. 743.

EVE'S CUSHION. *See* **Saxifraga hypnoides.**

EVOLVULUS (from *evolvo*, to untwist; to distinguish it from *Convolvulus*, many of the species of which are twiners). ORD. *Convolvulaceæ*. Stove, annual or perennial, prostrate or creeping, rarely erect herbs. Peduncles axillary, one or few-flowered; corolla subrotate, campanulate, or funnel-shaped, plicate. Leaves entire. There are about seventy known species, distributed throughout all tropical regions, but most of them are natives of Brazil. The species described below is the only one worthy of mention here. For culture, *see* **Convolvulus.**

E. purpureo-cæruleus (purple-blue). *fl.* purplish-blue, terminal on the leafy branches, pedicellate; corolla rotate, rich ultramarine-blue, with the centre white, and a purple ray diverging from that up the centre of each lobe. July and August. *l.* small, lanceolate, acute, entire. Stem quite woody below, and often about half-way up. *h.* 1½ft. Jamaica, 1845. Perennial. (B. M. 4202.)

EXACUM (a name used by Pliny, and derived by him from *ex*, out, and *ago*, to drive; in allusion to its supposed expelling powers). ORD. *Gentianeæ*. A genus containing about a score species of very pretty, erect, branched, stove or greenhouse, annual or perennial herbs, natives of India and Eastern Asia, the Malayan Archipelago, and Socotra. Flowers terminal and axillary; corolla salver-shaped or sub-rotate, with a globose or ventricose tube. Leaves opposite, decussate, sessile. The species are not often seen in gardens. They thrive best in a compost of peat and turfy loam, in equal proportions, and a plentiful supply of water is necessary. Seeds should be sown in April, and placed in bottom heat, and the seedlings carefully shifted into larger pots as required. Several other species of this elegant genus, besides those given below, are well worth growing, but as yet await introduction.

E. affine (related). *fl.* bluish-lilac, agreeably scented; stamens yellow. Summer and autumn. *l.* stalked, broadly ovate. *h.* 6in. Socotra, 1882. A compact-habited, free-flowering, warm greenhouse perennial. (G. C. n. s., xxi. 605.)

E. macranthum (large-flowered).* *fl.* about 2in. across, of a deep rich blue-purple colour, with large, bright yellow stamens, disposed in terminal and axillary, corymbose heads. December. *l.* large, glabrous, glossy. *h.* 1½ft. Ceylon, 1853. Stove annual. (B. M. 4771.)

Exacum—*continued.*

E. zeylanicum (Ceylon).* *fl.* of a beautiful violet colour; petals five, obovate; racemes terminal and axillary, forming an expanded, terminal, corymb-formed panicle. September. *l.* nearly sessile, ovate-lanceolate, acuminated. Stem and branches tetragonal. *h.* 1ft. to 2ft. Ceylon, 1848. Stove annual. (B. M. 4423.)

EXALBUMINOUS. Without albumen.

EXCURRENT. Central, as the stem of a Fir, with branches disposed regularly round it.

EXITELIA. A synonym of **Parinaria** (which *see*).

EXOCHORDA (from *exo*, external, and *chorde*, a cord; the free placentary cords external to the carpels have suggested the name of the genus). ORD. *Rosaceæ*. Very handsome, hardy shrubs, remarkable for the structure of their fruits, which consist of five small, compressed, bony carpels, adhering round a central axis, in a star-like manner. The species described below thrives in any good garden soil. Propagated by seeds, by layers, or by suckers. The second species, *E. serratifolia*, also a native of China, is not yet introduced.

E. grandiflora (large-flowered).* *fl.* white, large, in axillary, elongated, few-flowered racemes; calyx bell-shaped; petals four or five, rounded; stamens fifteen, short. May. *fr.* small. *l.* petiolate, lanceolate-oblong, entire or serrulate, membranous. *h.* 6ft. North China. A very handsome plant. (G. C. n. s., xvi. 73; B. M. 4795, under name of *Spiræa grandiflora*.)

EXOGENS. *See* **Dicotyledons.**

EXOGONIUM. Included under **Ipomæa** (which *see*).

EXOSTEMMA (from *exo*, without, and *stemma*, a crown; stamens exserted). ORD. *Rubiaceæ*. A genus of about twenty species of stove, evergreen trees or shrubs, inhabiting tropical America and the West Indies. Flowers white, axillary and solitary, or disposed in terminal, few or many-flowered panicles; corolla with a long tube and a five-lobed, salver-shaped limb. Leaves ovate or lanceolate, stalked or sub-sessile. For culture, *see* **Cinchona.**

E. Caribæum (Caribbean). *fl.* white, about the length of the leaves, sweet-scented; pedicels axillary, one-flowered. June. *l.* ovate-lanceolate, acuminated. *h.* 20ft. West Indies, 1780.

E. longiflorum (long-flowered). *fl.* white, 5in. long before expansion; pedicels axillary, very short. June. *l.* linear-lanceolate, attenuated at both ends. *h.* 20ft. St. Domingo, 1820. (B. M. 4186.)

EXOTHOSTEMON. A synonym of **Prestonia** (which *see*).

EXOTIC. Introduced from other countries. Not native.

EXSERTED. Anthers are said to be Exserted when longer than the corolla, or even when longer than its tube, if the limb be very spreading.

EXSTIPULATE. Without stipules.

EXTRA-AXILLARY. Growing from above or below the axils of the leaves or branches.

EXTRORSE. Turned outwards from the axis of growth of the series of organs to which it belongs.

EYE. A horticultural term for a leaf-bud; also for the centre or the central markings of a flower.

EYEBRIGHT. *See* **Euphrasia.**

EYSENHARDTIA (named in honour of C. W. Eysenhardt, M.D., and professor in the University of Konigsberg, in Prussia). ORD. *Leguminosæ*. A genus containing a couple of species of half-hardy, evergreen shrubs, natives of Mexico and Texas. They thrive in a compost of loam and peat. Young cuttings will root in sandy soil, if inserted under a bell glass.

E. amorphoides (Amorpha-like). *fl.* pale yellow; racemes terminal, cylindrical. June. *l.* imparipinnate; leaflets numerous, stipellate, glandular *h.* 4ft. to 6ft. Mexico, 1838.

END OF VOLUME I.

THE

DICTIONARY OF GARDENING,

An Encyclopædia of Horticulture.

The following are the Abbreviations used:—*fl.* flowers; *fr.* fruit; *l.* leaves; *h.* height; *deg.* degrees; *rhiz.* rhizomes; *cau.* caudex; *sti.* stipes.
The Asterisks (*) indicate plants that are especially good or distinct.

FABA (the old Latin name, from the same root as *phago*, to eat; the seeds are esculent). Bean. Ord. *Leguminosæ*. This genus, which contains but the species described below, is now included under *Vicia*. For culture, *see* **Bean.**

F. vulgaris (common). *fl.* white, with a blackish-blue silky spot in the middle of the wings. *l.* thick, with two to five broad, oval, mucronate leaflets; stipules semi-sagittate, oval; tendrils of leaves almost wanting. *h.* 2ft. to 3ft. As is the case with so many commonly cultivated food plants, the origin and native country of the Bean are doubtful. It was cultivated in prehistoric times in Europe, Egypt, and Arabia; and, according to De Candolle ("Origine des plantes cultivées"), it may be truly native about the Caspian Sea and in North Africa. There is a variety of this species (*equina*) called the Horse Bean.

FABACEÆ. *See* **Leguminosæ.**

FABIANA (named after Francisco Fabiano, of Valencia, in Spain, a promoter of botany). Ord. *Solanaceæ*. A genus containing about eleven species of South American shrubs. *F. imbricata* is a very pretty hardy evergreen Heath-like shrub, of erect, rigid growth. It thrives in almost any soil, and succeeds best when grown against a wall; in the more northern counties of England, it is necessary to protect it during severe weather. Increased readily by cuttings of firm young shoots, inserted in sandy soil, in a cold frame, in spring.

F. imbricata (imbricated).* *fl.* pure white, terminal, solitary, produced in great profusion; corolla funnel-shaped; limb short, reflexed. May. *l.* small, ovate, sessile, crowded. *h.* 3ft. Chili, 1838. This forms an excellent plant for the hardy Heath border, or for the decoration of the cool conservatory. (B. R. xxv. 59.)

FABRICIA. Now included under **Leptospermum** (which *see*).

FADYENIA (named after James MacFadyen, 1800-1850, author of a Flora of Jamaica). Ord. *Filices*. A peculiar and pretty monotypic genus, admirably adapted for a Wardian case. Sori oblong, in two series. Involucre large, sub-reniform, attached by the centre. For general cultivation, *see* **Ferns.**

F. prolifera (proliferous).* *fronds* entire, dimorphous; the sterile ones ¾in. to 1in. broad, elongated, and rooting at the apex; fertile one ligulate, narrowed below, 6in. to 9in. long, about ½in. broad. Cuba and Jamaica, 1843.

FAGELIA (named after Caspar Fagelius, a cultivator of plants). Ord. *Leguminosæ*. An ornamental decumbent, greenhouse, twining sub-shrub, clothed with clammy hairs. For culture, *see* **Kennedya.**

F. bituminosa (pitchy). *fl.* yellow, keel tipped with violet, on long, distant pedicels; racemes axillary. April to September. *l.* petiolate, pinnately-trifoliolate; leaflets rhomboid; stipules ovate, acuminated. Cape of Good Hope, 1774. (B. R. 261, under name of *Glycine bituminosa*.)

FAGOPYRUM (from *phago*, to eat, and *Pyros*, Wheat; in reference to the seeds being edible). Ord. *Polygonaceæ*. A genus of two or three hardy herbaceous plants. Perianth cut into five equal divisions, and not increasing in size along with the fruit, like some of its allies. Seed mealy. Leaves cordate or lanceolate. Stems erect, branching. The only species worthy of mention is *F. esculentum*. For culture, *see* **Polygonum.**

F. esculentum (edible). Common Buckwheat; Brank. *fl.* pink. Stem 2ft. to 3ft. high, branched. Central Asia; but now naturalised in various parts of Europe. Annual. Buckwheat is principally used in England as a food for pheasants; but on the Continent, and in some parts of the United States, it is largely employed for human food.

FAGRÆA (named after Jonas Theodore Fagræus, 1729-1797, a physician and botanist). Syns. *Cyrtophyllum*, *Kentia* (of Steudel), *Kuhlia*, *Picrophlœum*, and *Utania*. Ord. *Loganiaceæ*. A genus containing about thirty species of ornamental stove trees or shrubs. Flowers showy; corolla funnel-shaped, with an imbricate, five (rarely six or seven) cleft limb. Leaves large, opposite, broad, coriaceous. The species thrive in a compost of loam, peat, and sand. Cuttings of young shoots, made about April, root readily in sand, under a bell glass, with bottom heat. The species described below are probably the only ones yet in cultivation.

F. auriculata (auricled).* *fl.* yellow, very large; peduncles terminal, usually by threes. *l.* coriaceous, broad, cuneate-oblong, acute, veiny; interpetiolar stipules two-lobed, recurved. Java. An epiphytal shrub.

F. obovata (obovate). *fl.* white, fragrant, coriaceous, smaller than those of *F. zeylanica*; peduncles terminal, three-flowered, sub-corymbose. *l.* 5in. to 6in. long, thick; petioles furnished with a few glandular ciliæ, connected by interpetiolar stipules *h.* 12ft. Ceylon, 1816. Tree. (B. M. 4205.)

Fagræa—*continued.*

F. zeylanica (Cingalese). *fl.* white, large, few, terminal, umbellate. *l.* crowded, obovate-oblong, obtuse; bracts ovate, obtuse. Stem sub-quadrangular, shrubby, erect. *h.* 12ft. Ceylon, 1816. (B. M. 6080.)

FAGUS (the old Latin name, akin to Greek *Phegos*, an Oak, and perhaps derived from *phago*, to eat; the nuts were used as food in the early ages). Beech. ORD. *Cupuliferæ.* A genus containing about fifteen species of handsome, deciduous or evergreen trees or shrubs, widely distributed throughout the temperate and colder regions of both Northern and Southern hemispheres. Male flowers disposed in long-stalked, drooping heads; calyx four to seven-lobed. Female flowers two to four together, in a four-partite involucre of imbricating bracts. Leaves entire or toothed. The common Beech grows well in most dry soils, preferring a sandy loam, with chalky bottom, and light loams generally, to heavier soils. Propagation is effected by means of the seeds or nuts, which ripen in October. In order to keep them in a fit condition for sowing during the ensuing March or April, they should, after being

FIG. 1. BRANCHLET OF FAGUS SYLVATICA, showing Male and Female Flowers.

thoroughly dried, be mixed with about double the quantity of dry sand, in tubs or barrels, and stored in a loft or some cool place. Provided mice can be kept off the ground, it is better to sow the nuts immediately after they have been collected; they may either be sown in drills or in beds, covering with about 1in. of soil. As the Beech does not always transplant very readily, it will be necessary to replant in nursery rows every two or three seasons, until the seedlings have attained the desired size and are placed in the positions they are intended to occupy permanently. The numerous varieties of our native species are propagated by grafting on the type. The common Beech succeeds admirably as a hedge, which it is usual to trim close; and as the dead leaves cling to the stems in winter and during the early spring months, they give valuable shelter. An oil is expressed from Beech nuts.

F. antarctica (Antarctic).* *l.* ovate, blunt, glabrous, attenuated at the base, doubly dentate, alternate, petiolate, 1¼in. long. Tierra del Fuego, 1830. A deciduous shrub or tree, with rugged, tortuous branches. (H. F. A. 123.)

Fagus—*continued.*

F. betuloides (Birch-like).* Evergreen Beech. *l.* ovate-elliptic, obtuse, crenulate, leathery, shining, glabrous, round at the base, on short footstalks. Tierra del Fuego, 1830. An evergreen tree. (H. F. A. 124.)

F. ferruginea (rusty).* *l.* ovate, acuminate, thickly toothed, downy beneath, ciliate on the margin. United States, 1766. A large, deciduous tree, very closely resembling the common European species, from which it is distinguished by its longer, thinner, and less shining leaves.

F. obliqua (oblique). *l.* ovate-oblong, oblique, somewhat rhomboid, blunt, doubly serrated, entire at the base, attenuated into the petioles, and somewhat downy. *h.* 50ft. Chili. Hardy, deciduous.

F. sylvatica (sylvan). Common Beech. *l.* oblong-ovate, obscurely toothed; margin ciliate. *h.* 60ft. to 100ft. A triangular area between Norway, Asia Minor, and Spain. A large, deciduous tree. See Fig. 1. Of the numerous varieties of this splendid species, the following are the most important: *argenteo-variegatis*, leaves silver-striped; *asplenifolia, heterophylla, incisa*, and *quercifolia*, with more or less cut leaves; *cuprea*, leaves copper-coloured: *aureo-variegatis*, leaves gold-striped; *purpurea*, leaves deep purple; and the weeping or pendulous form, *pendula*.

FAIR MAIDS OF FRANCE. *See* **Ranunculus aconitifolius** and **Saxifraga granulata.**

FAIR MAIDS OF KENT. *See* **Ranunculus aconitifolius.**

FAIRY PRIMROSE. *See* **Primula minima.**

FAIRY RINGS. Green circles, or parts of circles, seen in pastures, and produced by the peculiar mode of growth of several species of Agarics and other Fungi. *Agaricus arvensis, A. gambosus*, and *Marasmius oreades*, are good examples of those usually inhabiting Fairy Rings.

FALCATE, FALCIFORM. Bent like a sickle.

FALCONERA. This genus is now included under *Albuca.*

FALKIA (named after John Peter Falk, 1730-1774, a Swede, Professor of Botany at St. Petersburgh). ORD. *Convolvulaceæ.* A genus containing three or four species of greenhouse or half-hardy, herbaceous plants, from South Africa. *F. repens* is a very pretty, little, greenhouse, evergreen creeper, thriving in a compost of loam and peat, or any light soil. Increased by cuttings, inserted under a hand glass, in April; or by divisions.

F. repens (creeping).* *fl.* red, with a paler throat; corolla campanulate, crenated; peduncles hardly longer than the leaves. May. *l.* scattered, petiolate, cordate-ovate, obtuse, entire. Stems decumbent, rooting; branches filiform. Cape of Good Hope, 1774. (B. M. 2228.)

FALLUGIA (named after Fallugius, a Florentine botanist, who flourished about the end of the seventeenth century). ORD. *Rosaceæ.* A monotypic genus. The species is an erect, much-branched shrub. For culture, *see* **Sieversia** (to which it is allied).

F. paradoxa (paradoxical). *fl.* white, large, showy, sub-corymbose, pedicellate. *l.* alternate, petiolate, irregularly three to five-lobed or pinnatifid, rarely entire; lobes linear, obtuse; margins recurved, snowy underneath. New Mexico. (B. M. 6660.)

FALSE ACACIA. *See* **Robinia Pseudo-acacia.**

FALSE DITTANY. *See* **Dictamnus albus.**

FALSE DRAGON-HEAD. *See* **Physostegia.**

FALSE LARCH. *See* **Pseudolarix.**

FAME FLOWER. *See* **Talinum teretifolium.**

FAN PALM. *See* **Chamærops, Corypha,** and **Sabal Blackburniana.**

FAN-SHAPED. Plaited like a fan; *e.g.*, the leaves of *Chamærops* and *Livistona.*

FARAMEA (said to be the native name in Guiana). SYN. *Tetramerium.* ORD. *Rubiaceæ.* A tropical American genus, containing about forty species, only one of which, perhaps, is in cultivation. *F. odoratissima* is a very ornamental, sweet-scented, stove, evergreen shrub, with flowers about the size of those of *Jasmine.* It thrives in fibry peat and loam, with the addition of a little silver sand

Faramea *continued.*

and some small lumps of charcoal. Cuttings, made in spring, will root, if inserted under a bell glass, in heat.

F. odoratissima (very sweet-scented).* *fl.* white, in terminal corymbs. *l.* oval-oblong, acutish at the base, abruptly acuminated at the apex. *h.* 6ft. West Indies, 1793.

FARFUGIUM GRANDE. *See* **Ligularia Kæmpferi aureo maculata.**

FARINA. Meal.

FARINACEOUS, FARINOSE. Mealy; having the texture of flour.

FARSETIA (named after Philip Farseti, a Venetian botanist). ORD. *Cruciferæ.* A genus of about twenty species of hardy or half-hardy, branched, erect herbs or sub-shrubs, more or less hoary or downy. They are natives of the Mediterranean region, Africa, and Asia Minor to Northern India. Inflorescence racemose or spicate. Leaves entire, opposite. Most of the species are very pretty, and the hardy perennials are well adapted for growing on rockwork, borders, &c., in ordinary garden soil. The less hardy sorts thrive well in a compost of sandy loam and peat. All are easily increased by seeds.

F. ægyptica (Egyptian). *fl.* white. June and July. *l.* linear, pressed, hoary. Stems shrubby, erect, much branched. *h.* 1ft. North Africa, 1788. Half-hardy.

F. clypeata (buckler-shaped). *fl.* yellow. June. *l.* oblong, repand. Stems herbaceous, erect. *h.* 1ft. to 2ft. South Europe, 1596. Hardy.

F. lunarioides (Lunaria-like). *fl.* yellow; sepals whitish. June. *l.* oblong-obovate, stalked, hoary. Stems suffruticose, ascendent. *h.* 1ft. Grecian Archipelago, 1731. Hardy. (B. M. 3087.)

FASCIATED. When a stem becomes much flattened, instead of retaining a cylindrical figure; *e.g.*, the Cockscomb.

FIG. 2. FATSIA JAPONICA.

FASCICLED, FASCICULAR, or FASCICULATE. In bundles or parcels.

FASTIGIATE. Tapering to a narrow point, like a pyramid.

FATRÆA. Included under **Terminalia** (which *see*).

FIG. 3. FATSIA PAPYRIFERA.

FATSIA (derived from the Japanese name of one of the species). ORD. *Araliaceæ.* A genus of half-hardy shrubs or small trees, allied to **Aralia** (which *see* for culture). All the species are described below.

F. horrida (horrid). *fl.* in terminal panicles. *l.* palmately lobed, cordate, petiolate, prickly. Stems thick, armed with yellow spines. *h.* 6ft. to 12ft. North-west America, 1829. Hardy. SYN. *Panax horridum.* (H. F. B. A. 98.)

F. japonica (Japanese).* *l.* large, leathery, digitate, deep shining green. Stem straight, forming an umbrella-like head. *h.* 3ft. to 5ft. Japan. A very fine half-hardy evergreen shrub for sub-tropical gardening. It is easily raised from seed, which should be sown in gentle heat; and portions of the stem, treated as cuttings, root freely. SYNS. *Aralia japonica* and *A. Sieboldii.* See Fig. 2.

F. j. variegata (variegated).* *l.* blotched and margined with white. Japan. Half-hardy.

F. j. v. aurea (golden-variegated).* Somewhat larger and stronger than the foregoing, and with a rich yellow variegation. Distinct and fine. Japan.

F. papyrifera (rice paper tree).* *fl.* greenish, in drooping panicles, which are 2ft. to 3ft. long. *l.* from 8in. to 12in. long, five or seven-lobed, clothed (as are also the stems) with a kind of down, but ultimately glabrous. Stem branching above. *h.* 6ft. to 8ft. Formosa, 1852. A noble half-hardy plant, which must be protected from all winds; very useful for sub-tropical gardening. SYN. *Aralia papyrifera.* See Fig. 3. (B. M. 4897.)

FAUX. The orifice of a calyx or corolla.

FAVEOLATE, FAVOSE. Pitted or excavated, like the cells of a honeycomb.

FEATHER GRASS. *See* **Stipa pennata.**

FEATHER-VEINED. Having veins which proceed from a midrib at an acute angle.

FEBRIFUGAL, FEBRIFUGE. Efficacious in moderating fevers.

FEDIA (supposed to be from *fedus*, the same as *hordus*, a kid, in allusion to the smell of the plant; but possibly one of Adanson's meaningless names). ORD. *Valerianeæ.* A pretty glabrous annual herb. Leaves entire or toothed. It is of easy culture in moderately good garden soil. Seeds should be sown in pots, in March,

Fedia—*continued.*

and the seedlings planted out thickly in the latter part of April, at which time seed may also be sown in the open border.

FIG. 4. FLOWERING BRANCH OF FEDIA CORNUCOPIÆ.

F. Cornucopiæ (Cornucopia-like).* *fl.* red, corymbose, in fascicles; peduncles thickened, fistular. July. *l.* ovate-oblong, toothed; lower ones petiolate, upper ones sessile. Stem purplish. *h.* 6in. South Europe, &c., 1796. See Fig. 4. (B. R. 155, under name of *Valeriana Cornucopiæ.*)

FEEA. *See* **Trichomanes.**

FELICIA (from *felix*, happy; in allusion to the cheerful appearance of the plants). ORD. *Compositæ.* A genus of about forty-five species of dwarf-growing sub-shrubs (rarely annual herbs), two of which are from Abyssinia, and all the rest from Southern Africa. *Felicia* is very nearly allied to *Aster.* Flower-heads radiate; ray-florets blue or white, the disk yellow; involucre hemispheric or broadly bell-shaped, with from two to a large number of series of narrow, imbricated, scarious-edged bracts. Leaves alternate, entire or toothed. The shrubby species like cool greenhouse treatment, and flourish in sandy peat. Propagated by seeds; or by cuttings, struck in sandy soil, under a bell glass.

F. fruticosus (shrubby).* *fl.-heads* solitary, upon terminal, solitary, naked, very slender peduncles; ray-florets purple, linear, acute, with one or two serratures at the margin; centre florets yellow, tubular; involucre ovate-cylindrical, of several linear-oblong, closely imbricated scales. May. *l.* spreading, linear, approaching to spathulate, impressed with dots; margin quite entire and recurved. Stem woody, much branched in a zigzag manner. *h.* 1ft. to 2ft. Cape of Good Hope. (B. M. 2718, under name of *Aster fruticosus.*)

F. reflexa (reflexed). *fl.-heads* red, white, terminal, closely resembling the common Daisy. Winter. *l.* ovate, sub-imbricate, recurved, ciliate. *h.* 1½ft. to 3ft. Cape of Good Hope, 1790. Shrubby. (B. M. 884, under name of *Aster reflexus.*)

FELWORT. *See* **Swertia.**

FEMALE FERN. A common name of **Asplenium Filix-fœmina** (which *see*).

FENCES. *See* **Hedges.**

FENESTRATE. Having a hole or gap through a membrane, and so resembling a window in a wall.

FENNEL (*Fœniculum vulgare*). A hardy perennial herb, native of temperate Europe, North Africa, and Western Asia, now become naturalised in some parts of this country. It is cultivated for the use of its leaves in fish sauces and for garnishing. The stalks are sometimes blanched, and eaten either boiled or raw. The seeds are also used for flavouring. Fennel (see Fig. 5) may be easily propagated by seeds or by division. The former may either be sown in drills 15in. apart, and the

FIG. 5. FENNEL.

plants afterwards thinned to a similar distance, or be sown in a bed, and transplanted when large enough. If seeds are not required, the tops should be occasionally removed, as this will encourage the production of young leaves. A plantation will last for several years.

FENNEL FLOWER. *See* **Nigella.**

FENNEL, GIANT. *See* **Ferula.**

FENUGREEK. *See* **Trigonella Fœnum græcum.**

FENZLIA. This genus is now included under **Gilia** (which *see*).

FERDINANDA. This genus is now included under **Zaluzania** (which *see*).

FEREIRIA. *See* **Hillia.**

FERNANDEZIA (named after George Garcias Fernandez, a Spanish botanist). ORD. *Orchideæ.* A small genus of epiphytal stove orchids, allied to *Brassia.* They are not of much horticultural beauty. The species best known is *F. robusta.* For culture, *see* **Brassia.**

F. robusta (robust). *fl.* bright yellow, barred and spotted with red on the lower portion of the lip; sepals oblong apiculate, bent backwards; petals ovate, obtuse, stretching a little forwards; lip longer and larger than the petals, three-lobed. May. *l.* keeled, 1½in. long, sharp at the extremities. Guatemala, 1841. This, the largest species of *Fernandezia*, is closely allied to *Lockhartia lunifera*, figured in Reichenbach's "Xenia." (B. M. 5592.)

FERNELIA (named after J. F. Fernel, 1497-1558, physician to Henry II. of France). ORD. *Rubiaceæ.* A genus containing four species of small glabrous stove evergreen shrubs, having much the habit of Box. Pedicels axillary, very short, bracteolate, one-flowered; corolla small. Leaves opposite, small, coriaceous, shortly petiolate, obovate-oblong, or sub-orbicular. The species described below requires treatment similar to **Rondeletia** (which *see*).

F. buxifolia (Box-leaved). *fl.*, lobes of the corolla obtuse. Berry obovate, crowned by the subulate lobes of the calyx. *l.* five to six lines long, and three to four broad. *h.* 1ft. to 3ft. Mauritius, 1816.

FERNS. Whether viewed collectively as plants of extreme beauty and interest when grown as specimens, or for their general usefulness in arrangements with flowering subjects, Ferns are indispensable, and possess attractions peculiar to themselves. The very large number of genera now in cultivation, including native and exotic, stove, greenhouse, and hardy, supply means of making a suitable selection for every requirement. Remarkable variation in size and habit is most noticeable among Ferns, apart from the extreme conditions under which the different ones succeed. The now almost universal use of plants and cut fronds intermixed in floral decorations, has led to their production in immense quantities annually, to supply the demand for a few of the more popular of genera and species that are suitable for the purpose. The popularity of Ferns is ever increasing, as ideas regarding the supposed difficulty in their culture, and the amount of heat required, have been of late considerably modified, many being found to succeed in much cooler positions than was at one time supposed to be suitable. The majority require more or less heat, but many that are kept in a high temperature would be healthier and do better in a somewhat cooler one. Hardy Ferns are, perhaps, more plentiful in varieties than in distinct species, although the latter are numerous. Both are interesting and useful for various positions outside, and are in combination extremely diverse in general habit. It will be impracticable, on account of space, to describe here separately the cultivation of every genus referred to this heading. The following general remarks respecting the treatment of the different groups, according to the amount of heat or other special requirements, with cultural notes on some of the principal genera, may, however, with the description accompanying each individual genus separately, prove sufficiently suggestive for the treatment of all.

PROPAGATION. This is effected in various ways, according to the different habits or modes of growth exhibited in the several types. The most general plan of propagation is by spores, but with many species it is at best difficult, and in many cases quite impossible, to obtain these, and raise plants from them successfully. The most popular of Ferns, Adiantums, and several species of *Pteris*, are easily raised in immense quantities from spores. All Ferns that form several crowns may be increased by division; and those with creeping rhizomes, like many of the Davallias, are easily perpetuated either by layering the points or removing portions that have formed roots. A few—Aspleniums particularly—produce small bulbils along the upper portion and at the end of the fronds, and these eventually form plants, if removed and placed in soil. The increase of Filmy Ferns is, in most cases, an extremely delicate operation. Plants imported from their native habitats, with every care taken in transit, frequently do not live to become established, even if they arrive in fairly good condition. These may be propagated by carefully made divisions of such plants as become established and grow well. Tree Ferns are imported in quantities, and a large proportion generally succeed. Young plants may be raised from spores, where obtainable, but it would take many years for them to grow to the size of imported stems. The spores of many of the Tree Ferns germinate freely enough, but, under cultivation, never advance beyond the prothallus stage.

Spores. The fronds from which spores are required should be carefully examined at frequent intervals, when they are beginning to ripen, in order to obtain the spores at the proper time. When the sori begin to turn brown, the fronds should be cut and allowed to dry in close paper bags. The sooner they are sown, after being kept a few days, the better, as any part of the year is suitable for the operation, early spring being, however, preferred for the majority of species. They should be sown

Ferns—*continued.*

in pots or shallow pans that have been half-filled with crocks, the remainder being filled to within ½in. of the top with a mixture of fine sifted loam and very small pieces of crushed brick. An even surface may be obtained by pressing firmly with the bottom of another pot. The soil should then be watered and allowed to drain before the spores are sown, as by watering afterwards the latter might be washed away. Fern spores are extremely minute, and, consequently, should be scattered very thinly over the surface of the soil, pieces of glass being placed over the tops of the pots. The pots should be stood in saucers of water and placed in a close frame of a propagating house, being kept shaded at all times during sunshine, but not in dull weather. Laying pieces of paper on the outside of the frame, and removing them when not required, is a handy method usually adopted. When the spores are sufficiently grown to be visible as very minute plants —a stage that varies considerably, with different Ferns, in the time taken to reach it—they should be very carefully pricked off in pots of similar soil, filled, this time, level with the top. Very small patches must be taken on a stick, having the least notch cut in the end, and they should be merely pressed into the new soil about 1in. apart. No water should be applied overhead until the little plants have been pricked off some time, and have formed fronds. Sufficient will have been supplied by the pots being placed in water, and the moisture contained inside the frame, which is not usually one with bottom heat. Adiantums are frequently fit for pricking out in a month or six weeks after being sown. These, or any others, should be returned to a similar frame afterwards, and kept close until small plants are established, when air should be very gradually admitted. If conditions are suitable, the young Ferns grow fast in the spring or summer; and the next shift should be into pots singly, or, in the case of Adiantums, each little bunch of plants may be treated as one, for quickly forming decorative subjects. Raising Ferns of any description from spores is an exceedingly delicate operation, and one that requires considerable care and attention to accomplish successfully. It frequently happens that spores obtained from fronds of any particular Fern which may have been kept separated from others, will, when sown, apparently produce a host of young plants that eventually are found to belong to another and commoner species or genus. The fact of spores being so light as to be removed and carried by a breath of wind, may account for the presence of the commoner one, that would probably overgrow the other; or good spores of the one desired may not have been present at all. The mode of treatment above described applies to the raising of both stove and greenhouse Ferns, and, with the exception of a cooler temperature, will be also suitable for the hardier species. Young plants should be potted on before they are very full of roots, as, if allowed to become starved in the younger stages, it is a long time before they recover.

Divisions, &c. The best time for dividing Ferns, or for propagating by means of the creeping rhizomes, is just before growth commences, in February or early spring. It is best not to divide too severely, as small plants are much better obtained from spores if that plan be practicable. Rhizomes should be pegged to a piece of peat, or on small pots of soil, and allowed to form roots before being detached. The insertion of the little bulbils in pots of soil, in a close frame, will soon increase the stock of those species which produce them.

STOVE FERNS. An idea is often formed that tropical Ferns require a great heat at all times, with constant heavy shading in summer, and but little air at that season as well. This is altogether a mistake, as the result is invariably weak, elongated fronds, that are at once subject to all insect pests, and are rarely strong enough to stand any change to which it may be necessary

Ferns—*continued*.

to subject them. Blinds on rollers, that admit of being let down and removed as desired, should be used. Although Ferns delight essentially in shade and moisture, both may be carried to an excess, especially in winter time, when all should be at rest. The growing and resting periods are as necessary with many Ferns as with flowering plants, although the ripening in autumn, as ordinarily understood, is not of so much importance. The general arrangement of stove Ferns greatly depends on the structure and space at command. Adiantums, Davallias, Gymnogrammes, and Platyceriums, may be cited as examples for situations where most light is obtainable, and only a thin shading applied in sunny weather; while Acrostichums, and the stove species of *Aspidium*, *Asplenium*, *Nephrodium*, and *Pteris*, succeed in darker or more shady positions. The introduction of Tree Ferns produces a fine effect where there is sufficient height, but, if planted out, these soon require much more room than it is possible to obtain in the majority of stoves. By growing them in tubs, and plunging, a more suitable appearance is presented, the restriction of the roots having a corresponding effect on the rate of growth in the fronds. Any repotting should be performed before growth commences, as, if it is deferred till afterwards, many of the young fronds will become crippled. For stove Ferns, a growing season of eight months should be allowed, namely, from February till September inclusive. The other four months should be the resting period, when a night temperature of 50deg. to 55deg. will be sufficient, with a minimum rise by day of 5deg. more. A drier atmosphere must also be maintained, and less water applied to the roots, at the same time avoiding an extreme in the latter case. When growth commences, the minimum night and day temperatures may be gradually raised, until, in summer, the former will seldom go below 60deg. or 65deg. Air should be carefully admitted, and plenty of water applied to the roots and amongst the pots, with a view to the production of fronds of moderate growth and good substance—conditions not to be insured by a close atmosphere and very high temperature. Light syringings may be occasionally applied to most stove Ferns in summer, but too much has a tendency to weaken many of the fronds. Adiantums, Gymnogrammes, and, generally speaking, species with powdery or very hairy fronds, should not be syringed at any time. The whole beauty of Ferns consists in the full development of the fronds; and if these are to be kept in good condition afterwards, until the new ones of the following year appear, it is important that the plants be kept properly watered and subjected to treatment, in summer, calculated to produce a moderate amount of solidified growth, that, in the autumn, should be thoroughly ripened by the admission of sun and air to the structure in which the Ferns are grown. If, as before recommended, blinds on rollers are in use for summer shading, they will, of necessity, have to pass over the roof ventilators. This has an advantage both of breaking the force of the wind and preventing an undue evaporation of moisture from the inside. If found to fit too closely, blocks may easily be fixed to the rafters at the top, to keep the shading a little open.

GREENHOUSE FERNS. A large number of Ferns, usually grown and treated as stove subjects, succeed equally well, but do not grow quite so fast, in a greenhouse temperature, and, wherever employed, either alone or in combination with flowering plants, are much appreciated. A more interesting structure than a cool Fernery attached to a conservatory, when well stocked and carefully arranged, can scarcely be imagined. The majority of Ferns succeed in comparatively small pots, and are consequently well suited for mixing with other occupants of the side stages. The stronger-growing ones are also well adapted for planting in permanent beds or amongst other plants, such as Camellias, &c., where not too much crowded, the partial shade and moisture suiting the Ferns admirably.

Ferns—*continued*.

Nearly all Adiantums do well under greenhouse treatment in summer, but must be removed to warmer quarters for the winter. Many Nephrodiums and species of *Pteris*, particularly *P. longifolia*, *P. serrulata* and its varieties, and *P. tremula*, do better planted out in a cool structure than anywhere else. *Lomaria gibba*, and other species, are among the most beautiful of cool decorative Ferns, and the same may be said of *Asplenium bulbiferum*, and others from Australia and New Zealand: *Davallia canariensis*, *Nephrolepis exaltata*, *Onychium japonicum*, *Woodwardia radicans*, *&c*. *Todea barbara* is well adapted for planting out in a position where considerable space can be allowed for its large fronds to develop; it may also be grown in pots, any cool house, or even a sheltered position outside, with protection in frosty weather, suiting it. The genus *Gleichenia* contains many beautiful species that do not require much heat, excepting two or three from tropical countries. If grown in large pans, and tied out with neat stakes, beautiful specimens may be obtained under greenhouse treatment. These are propagated by layering the slender rhizomes, or by separating rather large pieces from established plants, and potting separately. The shade necessary for ordinary greenhouse flowering plants in summer will also be suitable for Ferns, plenty of moisture being at that season supplied at the roots and, with few exceptions, such as Adiantums, overhead.

FERNS SUITABLE FOR BASKETS. Hanging baskets, either in the stove or greenhouse, are, at all times, an additional attraction, and the elegant and graceful habit of many Ferns constitutes them excellent subjects for use in that way. Baskets, made in different sizes, of stout galvanised wire, may be suspended from the roof, and, if carefully watered, the plants will succeed extremely well in most cases. Many are seen to much better advantage, especially those with long and drooping fronds, than when grown in pots for stage decoration. Some of the fast-growing Selaginellas are most useful to plant with basket Ferns, for covering the soil or hanging down. Adiantums will, again, be found very attractive, particularly *A. caudatum*, *A. cuneatum*, *A. gracillimum*, and *A. Moorei*, with *Asplenium Belangeri*, *A. longissimum*, and *A. viviparum*; *Davallia dissecta* and *D. pallida*; *Gymnogramme schizophylla*; *Nephrolepis davallioides* and *N. exaltata*, and many others that are of somewhat similar habit. Nearly all of these are amenable to cool-house treatment in summer.

FILMY FERNS. These constitute a distinct class, requiring different treatment from any other members of the family. Very few do well in an open house, as sufficient atmospheric moisture cannot be obtained. On the whole, they do not require much heat, being often found to grow stronger and keep in better health when cultivated in close cases, in a cool Fernery, than when placed in similar cases in the stove. Filmy Ferns should never be watered overhead, but the stones and moss amongst which they are generally grown must be kept continually moist by having water poured on from the small spout of a can. This, when evaporating inside the inclosed case, becomes condensed on the extremely numerous divisions of the fronds as represented in the majority of species, and its continued presence there invariably indicates good health and the frequency with which it will be necessary to give water. Pieces of rough fibry peat and loam, with charcoal and sphagnum, are most suitable for Filmy Ferns. Nearly all that grow in soil succeed better when planted amongst stones, while those that form rhizomes should be placed on blocks of peat, dead pieces of Tree Fern, &c. They must always be shaded from sunshine; and not much light is required at any time. The difficulty generally experienced is in establishing the plants; when once they begin to grow and increase, the treatment is, in most cases, simple enough. *Hymenophyllum*, *Todea*, and *Trichomanes*, are three of the principal genera

Ferns—*continued.*

among Filmy Ferns. *Todea superba* is a vigorous species, having large fronds of a filmy texture; and *T. hymenophylloides* is smaller-growing, but very desirable; both being beautiful and more easily grown than the majority of the plants in this section.

WARDIAN CASES. Ferns used for decorating Wardian cases must only include those of small or moderate growth, the space inside being very limited. The system admits of more moisture being kept round the plants than would be possible in an open room where the air is frequently dried either by burning gas or a fire. It is always important, in changing plants in these cases that become unhealthy, to substitute others from a cool house, as, if insufficiently hardened, the young fronds soon wither and die. Ample drainage must be provided, and, if plants in pots are used, the latter should be covered with growing sphagnum. Ferns in Wardian cases keep fresh and attractive for a long time if they receive proper attention. Cases somewhat similar in construction, may be used in cool houses for small collections of Filmy Ferns.

FIG. 6. DEAD TREE FERN, DECORATED WITH FERNS.

TREE FERNS. Considerable space and lofty houses are essential for growing and exhibiting Tree Ferns in their true characters. In Ferneries of limited size, where a few are cultivated, it is best to restrict their root growth in large pots or tubs, which also allows of their being re-arranged occasionally when overgrowing other smaller plants. In very large conservatories, a few permanent specimens planted out in well-drained borders, succeed, perhaps, better than in any other position, and always present a majestic appearance unexcelled by any other plants similarly employed. *Alsophila australis* and *A. excelsa*, *Cyathea dealbata* and *C. medullaris* (the latter is probably the tallest-growing of all our cultivated Ferns), with *Dicksonia antarctica*, are the best for culture in the greenhouse. All these may also be used in sub-tropical gardening outside in summer, in sheltered,

Ferns—*continued.*

shady places. There are many stove species of Tree Ferns, all of which are beautiful, and worthy of cultivation in large heated structures. They all, especially Alsophilas, delight in plenty of atmospheric moisture and shade. The stems of imported Tree Ferns should, on their arrival, be covered with damp moss or canvas, and be kept moist by syringing until the new fronds appear. The time this takes varies according to the condition in which they arrive, and the season. When the head of fronds is established, the covering may be removed from the stem; but frequent syringing in summer time is of the highest importance, as by far the greater portion of the stems of many is literally a mass of roots requiring a quantity of water. Tree Ferns, in bad health, may often be greatly improved by covering the stem from the base to the fronds with 1in. of sphagnum, and tying it on with string. If kept moist, the roots soon fill the moss, and the stem is thus considerably enlarged. Tree Ferns that are dead on arrival may be utilised by covering with epiphytal or other small Ferns for stove or greenhouse decoration (see Fig. 6), the top being scooped out, and a free-growing variety with a pendent habit inserted and planted in soil; others being fastened on the side with blocks of peat and some small wire.

HARDY FERNS. These are all attractive, and the majority succeed best when planted on rockwork in a shady situation, sheltered from high winds. A great diversity, both in size and habit, is represented by the British species and their innumerable varieties, apart from those introduced from North America, Japan, &c. Many suitable positions for hardy Ferns may be found in most gardens where their culture is not now attempted. They should have a good depth of soil, and plenty of water in summer. In the case of a collection, a pile of rockwork, built with rough stones, allows of a place being selected for all, according to their size and habit. A good clump of those which are plentiful should be planted together, and sufficient space allowed them to grow and develop, as in this way the different characters are much better shown than when only single plants are used. Attention in their arrangement should also be directed in placing the evergreen and deciduous species irregularly throughout the space covered, so that the whole may be, more or less, furnished at all seasons. In building a rockwork for hardy Ferns, the requirements of the plants must be the main object, large, well-drained pockets being insured in preference to the appearance of the stones, that are, in great part, hidden by the fronds. Loam and peat, with a quantity of crushed stone or brick, intermixed and used round the roots when planting, materially assist them to become established. The Royal Fern (*Osmunda regalis*) is one of the most handsome, and succeeds best when planted in a partial bog, or by the side of water.

UNDERGROUND FERNERY. This is an interesting structure, to be seen only in a few places, where the owners bestow special attention on Fern culture in its various aspects. It consists of a large cavity, dug in the middle of a hill, and covered with sheet glass, the hill itself being surrounded on the summit with trees. A flight of steps communicates with the interior, where Ferns are grown on the inside of the cavity in prepared soil, narrow paths or stepping stones being provided on which to walk amongst them. A fountain, or other arrangement for water, supplies the necessary moisture. The plants do not require artificial heat, as they are not much affected by fluctuations of temperature outside, and a subdued light is constantly admitted by the glass overhead. A view of an underground Fernery is shown in Fig. 7.

SOIL, POTS, &C., FOR FERN CULTURE. Nearly all Ferns require a quantity of water in summer, and rarely need to be dry at the roots at any season, consequently a very important matter is that of efficient drainage.

Ferns—*continued.*

Anything like a sour or waterlogged soil is either detrimental or fatal, even to those which are not quickly injured in other respects. Success in the cultivation of established plants depends more on this, with careful watering, temperature, atmospheric moisture, proper shade, &c., than on any soil in which they may be grown.

FIG. 7. VIEW OF UNDERGROUND FERNERY.

Adiantums, for instance, succeed well either in peat or loam alone, the texture of the fronds being firmer in the latter instance, and presenting apparently the only difference. A large proportion of peat was at one time considered necessary for all Ferns, but the superior qualities of leaf soil in their culture, where it can be obtained, have been more fully recognised of late, with considerable advantage to the plants. Soft sandstone, mixed with the soil, tends to keep it porous, and suits some varieties better than others; and charcoal may be used freely with all. The different habits will often suggest the mode of treatment required. It will not be far wrong to say that a compost of half loam, to which is added an equal quantity of leaf soil and peat combined, and sufficient charcoal, small pieces of crocks, or sharp sand, to keep the whole open, may be used successfully for all Tree Ferns and any established plants of *Adiantum*, *Aspidium*, *Asplenium*, many species of *Davallia*, *Gymnogramme*, *Lomaria*, *Nephrodium*, *Pteris*, and any others of similar habit. The species of *Acrostichum*, *Davallia*, &c., that form slender rhizomes, must be attached to something on which they can grow. A good plan is to cultivate in pans, placing an inverted pot or a piece of Tree Fern stem in the middle, and then building a small mound on the top with lumps of peat, loam, and sphagnum, afterwards fixing the rhizomes to the surface with small pegs. Epiphytal Ferns, of which *Platycerium* is a well-known and distinct genus, often succeed admirably if fastened with a little moss and peat to a block of wood, and suspended in the stove. They

Ferns—*continued.*

should be kept rather dry in winter. Similar composts, as advised above, if passed through a sieve, may be used for young plants. Ferns succeed in pots comparatively small for the size of plants, if due attention is given to watering. Small pots have also an advantage in appearance; and any deficiency in the quantity of food contained in the soil may be supplied with applications of manure water during the growing season.

Insects. Ferns, especially those under stove treatment, are liable to be attacked by several destructive insect pests. Thrips are their greatest enemies, causing irreparable damage to the fronds. Frequent fumigating becomes a necessity; this must be done lightly and with the greatest care, on account of the tender growth. Any Aphides will also be destroyed by the smoke at the same time. Brown and White Scale are sometimes plentiful, and these must be removed by sponge or brush. The first-named is the one most common on Ferns, the other, fortunately, being more rarely found, as, when once established, it is very difficult to eradicate. Mealy Bug must be destroyed in a similar way to Scale, as an insecticide strong enough to kill either, will, to say the least, be dangerous to use, in consequence of causing injury to the fronds of delicate texture. In winter, when the plants are at rest, the whole should be examined and cleaned, as stronger measures may then be adopted, by fumigation or the use of an insecticide, than would be safe after growth commences. At all times, a watch must be kept for the first appearance of insects, as proper means for destruction then applied are always more effective in their results.

FERONIA (mythological, after Feronia, a nymph who presided over the woods and groves, and was worshipped by the Romans as a goddess). ORD. *Rutaceæ*. A stove evergreen fruit-tree, allied to the Orange (*Citrus*). It thrives well in a mixture of rich loam and peat, with a little sand added. Increased, in spring or summer, by placing cuttings of ripe young shoots in sandy soil, under glass, in bottom heat.

FIG. 8. FLOWERING SPIKE OF FERRARIA UNDULATA.

Feronia—*continued.*

F. elephantum. Elephant's Apple. *fl.* white, with reddish anthers; panicle small, axillary, or terminal. *fr.* large, about the size of an apple, with a greyish rind; pulpy part edible. *l.* impari-pinnate; leaflets five to seven, obovate, sessile, crenulated, shining. *h.* 30ft. Coromandel, 1804. (B. F. S. 121.)

FERRARIA (named after J. B. Ferrari, 1584-1653, an Italian botanist). ORD. *Irideæ.* A genus of half-a-dozen species of interesting dwarf bulbous plants, with curiously spotted evanescent blossoms, from the Cape of Good Hope. This genus belongs to the section *Moræeæ*; it has many-flowered spathes, the filaments united in a tube, and the petaloid stigmas fringed. In a warm, sunny situation, and if planted about 6in. deep, Ferrarias prove hardy. Increased by seeds and offsets. They rarely grow more than 6in. in height.

F. antherosa (large-anthered). A synonym of *F. Ferrariola.*

F. atrata (blackish). *fl.* dark reddish-purple, fringed with brownish-green. (L. B. C. 1356.)

F. divaricata (divaricate). *fl.* brown. May to July. *l.* linear, acute, glaucescent. Stem branched at top. 1825. (S. B. F. G. 192.)

F. Ferrariola (Ferrariola).* *fl.* greenish-brown. March to July. *l.* equitant, ensiform; lower narrow. Stem simple. 1800. SYN. *F. antherosa.* (B. M. 751.)

F. obtusifolia (obtuse-leaved). *fl.* brown. May to July. *l.* distichous, ensiform, obtuse, keeled on both sides. Stem erect, branched, many-flowered. 1825. (S. B. F. G. 148.)

F. uncinata (hooked). *fl.* brown; spathe two-flowered; segments of perianth involuted at apex. May to July. *l.* linear, striated, hooked at top. Stem branched, shorter than the leaves. 1825. (S. B. F. G. 161.)

F. undulata (waved).* *fl.* greenish-brown. March and April. *l.* equitant, ensiform, wavy; inner twice as narrow as the outer. Stem branched. 1755. See Fig. 8. (B. M. 144.)

FERRUGINOUS. Iron-coloured, rusty.

FERTILISATION BY INSECTS. It is only within comparatively recent years that the important part played by Insects in the Fertilisation of flowers, has been thoroughly realised. A goodly number of plants will be found, upon examination, to bear flowers manifestly adapted for Insect visitations; and observations will prove that in the cases where precautions are taken to prevent these, Fertilisation does not occur, although the flowers in question may be hermaphrodite. As a rule, flowers of gay colours, those possessing much scent or secreting nectar, are more or less dependent upon Insect agency. Most diœcious plants, or even hermaphrodite ones, in the Fertilisation of which the wind is a necessary auxiliary, present peculiarities of structure which do not obtain in those which are now called "entomophilous;" they do not secrete nectar, the pollen is too dry to adhere to Insects, and the corolla is either absent, or possesses neither the colour, scent, nor nectar which attract them. Amongst hermaphrodite flowers which are homogamous—that is to say, those in which the stamens and stigma ripen together—there are some which, experiment has proved, are sterile with their own pollen, but fertile enough if furnished with pollen from the flowers of other plants of the same species. The scarlet-flowered *Linum grandiflorum* is, according to the observations of Darwin, a case in point. The same authority has shown conclusively enough, by a series of carefully conducted experiments, that, in the case of the common Primrose, more capsules and larger seeds are developed as the result of Cross-fertilisation than when Self-fertilisation obtains. Therefore, unless the aid of the cultivator be called into requisition, in some cases Insect visits are absolutely essential, and in others of considerable value, to the species.

FERULA (the old Latin name, perhaps from *ferio*, to strike; stems used as rods). Giant Fennel. Including the genera *Ferulago* and *Narthex*, which are sunk under *Ferula* by the authors of the "Genera Plantarum." ORD. *Umbelliferæ.* A genus of about forty species of splendid hardy herbaceous plants, natives of Southern Europe, Northern Africa, and Central and Western Asia. Umbels of many rays; lateral ones usually opposite or verticillate. Leaves supra-decompound; leaflets usually cleft into linear segments. Stems tall. Roots thick. They are of very simple cultivation in almost any ordinary garden soil; and form admirable plants for growing near water, on banks and herbaceous borders, where their deep green, elegant foliage is produced almost in midwinter. It is important to plant them in permanent situations. The two best species are, perhaps, *communis* and *tingitana*, but all the others below named are well worth growing.

F. Assafœtida (Asafœtida). *fl.* greenish-yellow; umbels stalked. July. *l.*, radical ones 1½ft. long, stalked; cauline ones broadly sheathing; both cut into oblong-lanceolate, obtuse segments, 1in. to 2in. long. *h.* 7ft. Persia, 1855.

F. asparagifolia (Asparagus-leaved).* *fl.* yellow. *l.*, radical ones (including the petiole) 1ft. to 2ft. long, broadly ovate in outline, quadripinnate, the divisions very narrow, linear, hairy; upper cauline leaves sheath-like; involucral ones numerous, oblong-lanceolate, acute, reflexed. *h.* 4ft. to 5ft. Asia Minor.

FIG. 9. FERULA COMMUNIS.

F. communis (common).* *fl.* yellow; central umbel nearly sessile; lateral ones male, pedunculate; involucre wanting. June. *l.* green; leaflets linear-setaceous, flaccid; sheaths of upper leaves very large. *h.* 8ft. to 12ft. Mediterranean region, 1597. A very noble herbaceous plant. See Fig. 9. (S. F. G. 279, under name of *F. nodiflora.*)

F. Ferulago (Ferulago). *fl.* yellow, in a large terminal umbel; leaves of involucre numerous, oblong-lanceolate, reflexed. June. *l.*, leaflets pinnatifid, divaricate; segments linear, cuspidate. Stem terete, striated. *h.* 6ft. to 8ft. Spain. (J. F. A. 5, under name of *F. nodiflora.*)

F. glauca (glaucous).* *fl.* yellow; central umbel pedunculate; lateral ones male, on longer peduncles; involucre wanting. June. *l.* glaucous beneath; leaflets linear, elongated, flat. Stem terete, branched. *h.* 6ft. to 8ft. South Europe, 1596.

F. persica (Persian). *fl.* yellow; involucre and involucels wanting. *l.*, leaflets rather remote or decurrently pinnate; segments linear-lanceolate, dilated and cut at the apex. Stem terete, glaucous. *h.* 3ft. to 6ft. Persia, 1782. (B. M. 2096.)

F. Sumbul (Sumbul). A newly imported species, with graceful habit, elegant fern-like foliage, and stately pyramidal paniculate inflorescences. *h.* 9ft. Turkestan, 1872. This species—remarkable for the fœtid, musky, and milky juice of its root—was introduced into Russia in 1835, as a substitute for musk, and a remedy for cholera; thence the drug reached Germany and England, where it was admitted into the Pharmacopœia in 1867. (B. M. 6196.)

F. tingitana (Tangiers).* *fl.* yellow; terminal umbels on short peduncles; lateral umbels few, male, on longer peduncles;

Ferula—*continued.*

FIG. 10. FERULA TINGITANA.

involucre wanting. June. *l.* shining; leaflets or segments oblong-lanceolate, deeply toothed; upper petiole large, sheathing. Stem terete, branched. *h.* 6ft. to 8ft. Northern Africa, 1680. See Fig. 10.

FERULAGO. Included under **Ferula** (which *see*).

FESCUE GRASS. *See* **Festuca.**

FESTUCA (the old Latin name, meaning originally a stem or straw). Fescue Grass. ORD. *Gramineæ.* A large genus, containing about eighty species, principally natives of Arctic, cold and temperate regions. Nine species are natives of Britain. They are chiefly agricultural grasses. Several are, however, very graceful, and deserving of cultivation. Panicles loose; spikelets oblong, more or less compressed. *F. glauca* and *F. nigrescens* are particularly neat and compact in growth, and are well adapted for borders. They are of the easiest culture in common garden soil. Propagated by seeds, or by divisions.

FEVERFEW. *See* **Pyrethrum Parthenium.**

FEVILLEA (named after Louis Feuillée, 1660-1732, a traveller and botanist). SYN. *Nhandiroba.* ORD. *Cucurbitaceæ.* A genus containing five or six species of climbing shrubs, natives of tropical America. *F. Moorei,* perhaps the only one in cultivation, is a rampant evergreen stove climber, thriving in a sandy loam. Propagated by cuttings, made of the young wood, in summer, and inserted in sandy loam, under a bell glass, in heat.

F. Moorei (Moore's). *fl.* (males only known) pale brick red; pedicel slender, jointed in the middle; corolla lobes orbicular, or

Fevillea—*continued.*

broader towards the rounded apex; margins undulate. *l.* alternate, membranous, 3in. to 5in. long, shining, broadly ovate, long acuminate, rounded at the base. Guiana (?). A slender, quite glabrous climber. (B. M. 6356.)

FIBRILLOSE. Covered with little strings or fibres.

FIBROUS. Composed of fibres.

FICARIA. This genus is now included under **Ranunculus** (which *see*).

FICOIDEÆ. A large natural order, containing about 450 species, principally distributed throughout tropical and sub-tropical regions. They are small shrubs, undershrubs, or herbs. Flowers terminal or axillary, solitary, or in cymes, often very beautiful, sometimes minute and inconspicuous. Leaves opposite or alternate, undivided, usually fleshy or thickened, flat, terete, or triangular. None of the genera are of much importance from an economic point of view; some of the species of *Tetragonia* are used as pot-herbs. The genus just named, and *Mesembryanthemum,* are the best known; indeed, the natural order is called *Mesembryanthemeæ* in some works.

FIG. 11. FICUS COOPERI (page 12).

FICUS (the old Latin name, akin to the Greek *sfukon* or *sukon*, a fig; the Fig-tree has nearly the same name in all the European languages). Fig-tree. ORD. *Urticaceæ*. An extensive genus of usually stove or greenhouse trees or shrubs. Flowers monœcious, inserted upon the interior surface of a hollow, globular or pear-shaped fleshy receptacle, in whose tip is an orifice closed with small scales; those in the upper part male, the rest female. Very ornamental plants, of easy culture. They are readily propagated by cuttings or eyes, having a leaf attached in the case of the evergreen species, inserted in a close frame inside a propagating house, in early spring.

Ficus—*continued.*

small pot. It succeeds well in a greenhouse, and also outside in summer. Any of the species of *Ficus* do well in sandy loam, with the addition of a little leaf soil, and only small pots, in comparison to the size of plant, need be used. Plenty of syringing, or occasional sponging, will keep the leaves clean, and almost any amount of water may be applied to the roots. The species which grow on walls are the best of inside plants that could be used for the purpose, as, once started, they soon cover a considerable space and always present a lively green appearance. For culture of *F. Carica*, *see* **Fig.**

FIG. 12. TERMINAL SHOOT OF FICUS EXSCULPTA.

F. elastica is one of the most ornamental and extensively-grown species, and a plant that withstands confinement in rooms better, perhaps, than any other. It is also well adapted for stove or greenhouse decoration, and for sub-tropical gardening in summer outside. Shoots 1ft. long, if furnished with leaves, soon root, and form useful plants much quicker than eyes, which, however, have the advantage of increasing a much larger quantity. Small specimens are most attractive when restricted to a single stem. These may be afterwards grown into tall branched plants if desired, by keeping them several years and pinching out the points. *F. Chauvieri* is a fine species that forms a large bush, even when grown in a comparatively

F. acuminata (sharp-pointed). *fl.*, perianth three-cleft or three-partite, with the segments lanceolate and acuminated. Receptacle solitary, axillary, globose, pendent, of a deep bright orange colour, somewhat mealy and tuberculated on the surface, and terminating a stalk longer than itself. *l.* 4in. or 5in. long, somewhat coriaceous, elliptical, petiolated, veiny, glabrous above, and full green, downy beneath, with the veins prominent. Stem (under cultivation in this country) 5ft. to 6ft. high. Silhet, 1833. (B. M. 3282.)

F. barbata (bearded).* *l.* dark green, cordate, about 3in. long; apex elongated; edges clothed with long brown hairs. East Indies, 1832. A handsome plant for covering the walls of stoves; it has a creeping and rooting habit, similar to Ivy.

F. benjamina. Benjamin-tree. Receptacles solitary, or in pairs, globular, about ½in. in diameter when ripe. *l.* ovate, or ovate-oblong, acuminate, shortly stalked, 2in. to 4in. long, entire,

Ficus—*continued.*

thinly coriaceous, with numerous rather fine, parallel, primary veins. Tropical Asia, Australia. A large elegant greenhouse tree, with slender pendulous branches, quite glabrous.

F. Brassii (Brass's).* *l.* somewhat fiddle-shaped, rich deep green. Stems and petioles ferruginously tomentose. Sierra Leone. A free, erect-growing species, equally suited for stove, greenhouse, or sub-tropical purposes.

F. Carica (Carian).* Common Fig-tree. *l.* simple, alternate, stipulate, palmate and sub-trilobate, rough above, pubescent beneath. *h.* 15ft. to 30ft. Mediterranean region, &c., 1548. For culture, &c., *see* **Fig.**

F. Chauvieri (Chauvier's).* *l.* oval-obtuse, very dark shining green, with pale yellow veins, having one or more large marginal undulations. This is described as being a noble species, with a faultless habit, and, next to *F. elastica*, is the best for outside culture in summer.

F. comosa (tufted). Female florets pedicellate, growing amongst long, narrow, acuminate, chaffy, white scales; male florets trifid, the divisions more acute than in the female. Receptacles obovate-globose, small, the size of large peas, produced singly or more often in pairs, from the axils of the petioles on the terminal branchlets. *l.* very smooth and shining, dark green above, pale beneath, coriaceous and thickish, entire, with a sharp, thin, pellucid edge. Trunk rather slender, about 1ft. in diameter, soon dividing into numerous spreading, or even declining branches. Branches slender, bearing conglomerate masses of leaves towards their ends. *h.* 40ft. India. A very handsome greenhouse tree. (B. M. 3305.)

F. Cooperi (Cooper's).* *l.* dark green, ovate, 1ft. or more long, 3in. to 4in. wide. Probably Australia. A good ornamental-leaved plant for either stove or greenhouse decoration. See Fig. 11, page 10.

F. dealbata (whitened).* *l.* elliptic, about 1ft. long by 6in. broad, coriaceous, deep green above, and, from the presence of a thick coat of silky hairs beneath, the under side is of snowy whiteness, which is particularly conspicuous in the young unfolding leaves. Peru, 1867. A very distinct and beautiful greenhouse species. (I. H. 1870, 4.)

F. diversifolia (opposite-leaved).* *l.* leathery, rounded above, narrowed into the short stalk below, upper surface bright green, dotted with light brown specks; lower pale green. A compact grower, well adapted for general decorative purposes. Greenhouse. (G. C. 1881, xvi. 247.)

F. eburnea (ivory).* *l.* oblong-ovate, petiolate, about 15in. long, 9in. broad, bright shining green, with stout ivory-white midribs and principal veins. India, 1869. A fine free-growing greenhouse species.

F. elastica (elastic).* Indiarubber Plant. *l.* coriaceous, 6in. to 18in. long, and 3in. to 6in. broad; upper surface dark bright shining green, yellowish-green below. East Indies, 1815. This splendid plant is very largely grown, both for indoor decoration and for sub-tropical gardening. (G. C. 1874, ii. 358.)

F. e. foliis aureo-marginatis (gold-margined-leaved). A very effective variety with golden-edged leaves, especially in autumn, when it has become full-coloured. The yellow band is about 1in. broad, contrasting beautifully with the dark shining green of the centre. Greenhouse. There are also other variegated forms of less value.

F. exsculpta (cut-out).* *l.* shortly stalked, lanceolate in outline, sinuately lobed; lobes again sinuate so as to produce a prettily cut margin. South Sea Islands, 1879. A very handsome stove evergreen, the curious crenations giving the leaf the appearance of having been stamped or punched out. See Fig. 12, for which we are indebted to Mr. Wm. Bull.

F. glomerata (glomerate). *l.* thin, elliptic, acuminate, 6in. to 8in. long, 2in. broad, on long petioles. Stems terete, finely pubescent. Australia, 1869. A free-growing greenhouse species, of slender habit. SYN. *F. vesca.*

F. macrophylla (large-leaved).* Australian Banyan; Moreton Bay Fig. *l.* thin, coriaceous, glossy, ovate-oblong, entire, cordate at the base, 4in. to 10in. long, 3in. to 4in. broad; veins slightly elevated on both surfaces; petioles smooth, 1in. to 2in. long. Queensland and New South Wales, 1869. Greenhouse.

F. minima (smaller). *See* **F. stipulata.**

F. Parcelli (Parcell's).* *l.* oblong-acuminate, serrated, bright green, irregularly blotched with dark green and ivory-white. Polynesia, 1874. A very ornamental variegated stove plant. (F. d. S. 2273-4.)

F. religiosa (religious). Peepul. *l.* bright green, nearly cordate; apex elongated into a tail-like process. *h.* 25ft. East Indies, 1731. A handsome stove plant for decorative purposes, forming itself into a compact bush. (B. F. S. 314.)

F. repens (creeping). A synonym of *F. stipulata.*

F. Roxburghii (Roxburgh's). *fl.* green. *fr.* collected in bundles of eight to twelve near root, turnip-shaped, ribbed, villous, having umbilicus closed by numerous cordate imbricate scales. *l.* large, smooth, roundish-cordate, three-nerved, downy on the nerves beneath, sometimes repandly toothed. *h.* 20ft. Silhet, 1840. Greenhouse. See Fig. 13. (R. H. 1872, 385.)

F. rubiginosa (rusty-leaved). ., perianth three-parted; seg-

Ficus—*continued.*

FIG. 13. FRUIT AND LEAF OF FICUS ROXBURGHII.

ments roundish-oval, concave. Receptacle greenish-brown, globose, with an obtuse umbo at the point, the surface granulated with small tubercles. *l.* numerous, handsome, 3in. to 4in. long, coriaceous, elliptical, quite entire, on petioles about 1in. long, obtuse at the point and at the base; when young, covered, especially on the under side, with a ferruginous down; the older ones are glabrous except on the nerves beneath. Branches spreading, numerous. New South Wales, 1827. A small stove tree. (B. M. 2939.)

F. scandens (climbing). A synonym of *F. stipulata.*

F. stipulata (stipulate).* *l.* small, roundish, dark green. A very handsome little climber, attaching itself to walls, &c., like Ivy. It is half-hardy, and is frequently seen in greenhouses. China and Japan, 1721. SYNS. *F. repens* and *F. scandens.* (B. M. 6657.) *F. minima*, and other small-leaved forms, are only slender-twigged, extensively creeping states of barren young plants of *F. stipulata.*

F. Suringarii (Suringar's). *l.* large, cordate, serrate; upper surface rich dark green; main ribs deep red. Amboyna, 1866. An ornamental erect-growing stove species.

F. vesca (weak). A synonym of *F. glomerata.*

FIDDLE-SHAPED. Obovate, with one or two deep recesses on each side.

FIDDLE WOOD. *See* **Citharexylum.**

FIELDIA (named in honour of Baron Field, F.L.S., once Judge of the Supreme Court of New South Wales). ORD. *Gesneraceæ.* An ornamental climbing, radicant, greenhouse evergreen shrub, thriving well in a compost of peat and loam, to which a little sand and small pieces of charcoal have been added. Increased by cuttings of firm side shoots, left intact, and planted in sandy soil, under a glass.

F. australis (Southern). *fl.* white, pendulous; corolla tubular, ventricose; peduncles axillary, solitary, one-flowered. July. *l.* simple, opposite, remote, elliptic, coarsely serrated, acute at both ends. New South Wales, 1826. (B.M. 5089.)

FIG (*Ficus Carica*). The Fig, as a fruit-producing tree, has been cultivated from remote antiquity. To say nothing of America and the countries of the Southern hemisphere, the cultivation of the Fig must be very ancient, and is now general from the islands of the North Atlantic eastward, through the warm temperate and sub-tropical regions eastward to China, where, on the authority of Dr. Bretschneider, it was carried on, at all events, as early as the latter part of the fourteenth century. According to various authorities, it is a native of the Mediterranean region, Syria, Eastern Persia, to Afghanistan. It has become naturalised in South-west France, &c. The exact date of its introduction into Britain remains in obscurity; and, like the Vine, in all probability, it disappeared from Britain for a time. According to Pliny, it was largely cultivated by the Romans, who were possessed of a number of different sorts prior to the Christian era. The re-introduction of the Fig is said to have taken place in 1525, when Cardinal Pole brought several trees from Italy, and planted them in the gardens of the Archbishop's Palace at Lambeth. Another celebrated tree was introduced from Aleppo, in 1648, by Dr. Pocock, the eminent traveller, and placed in the garden of the Regius Professor of Hebrew, at Christ Church, Oxford. In 1809, it was considerably damaged by a fire, and the large trunk decayed and was removed. A number of fresh branches, however, sprang from the root, and, in 1819, those in the centre of the tree were 21ft. high. It is remarkable that a tree with wood of such a soft nature should live to the age of even several centuries in climates suitable to its growth. In Britain, when unprotected, the Fig is sometimes killed to the ground by very severe frosts, but becomes re-established by the production of suckers from the roots; at other times, the points of the shoots are destroyed by frost less severe. The fresh fruit does not find general favour in this country, partly because successful culture involves the necessity of heated glass structures in most districts, and the very limited time it remains in good condition when ripe. The skin is also extremely tender, and thus the fruits are among the worst for packing to travel any distance. In Sussex and other mild districts along the South Coast, the tree will grow as a standard, but it will not succeed as such further inland. The generally necessary situation is a wall with a south or south-west aspect; but in places where the summers are hot, and very sharp frosts of rare occurrence, Fig-trees may be grown as espaliers, being easily protected in winter

FIG. 14. FRUITING BRANCH OF FIG.

Fig—*continued.*

as much as would be required. The Fig possesses the extraordinary property of producing two, and, in some climates, under most favourable conditions, three crops in a year. The fruit supply being thus extended over such a lengthened period, becomes to the people of the East, where the trees are much grown, an important source of food, both in a fresh and in a dried state. The annual importation to this country alone of some hundreds of tons of dried Figs, is an indication of the quantity cultivated, and the crops secured. The same article also forms one of considerable commerce in Italy, Spain, Provence, and in some parts of France.

As it is not generally understood, it may be interesting to state here that the flowers of the Fig are unisexual, and produced in large quantities inside a fleshy receptacle that is closely united and almost closed at the summit. The female flowers are most numerous, and situated on the bottom and greater part of the inside of the receptacle. On these becoming fertilised—a condition not absolutely essential with all for the ripening of the fruit—each becomes a seed, which is surrounded with pulp, and these, with the receptacle, form the fruit as shown in Fig. 14. An idea of the enormous quantity of seeds contained in a fruit may be obtained by examining an imported dried specimen.

PROPAGATION. This is easily effected in various ways—by seed, cuttings, layers, and suckers, also by grafting.

Seed. Propagation by this method is not much practised, but is sometimes adopted with a view to raising, from the sorts which succeed best in this country, other new and, perhaps, hardier varieties than those introduced from warmer climates. The seed, if required, should be carefully cleaned from the pulp of some of the finest and ripest fruits, and kept till January, when it should be sown in heat, and the young plants afterwards grown on as rapidly as possible, as on this mainly depends the time taken in obtaining the first fruit.

Cuttings, &c. The best cuttings are short-jointed growths of the previous year, from 6in. to 9in. in length; if with a heel, so much the better. They may be inserted in pots, and placed in bottom heat, in early spring. Some prefer selecting them in autumn, and laying the ends in the ground all winter, providing protection for the part exposed. Whether treated in this way or taken directly from the plants and inserted, they generally root freely, and, if grown on in heat, soon form good plants. Propagation by layers is a quick method of obtaining fruiting plants in a limited time, as good-sized branches with fruiting wood may be successfully rooted in one season, and may then be detached from the parent. Suckers are freely produced where allowed, and may also be grown into plants; but, on account of the wood in these being invariably very soft, they are inferior to those grown either from cuttings or layers. Grafting is practicable if desired, the scions being cut in autumn, laid in the ground all winter, and inserted, soon after the stock commences its growth, in spring. Figs being so easily increased by the other means above named, this method is but little adopted.

CULTIVATION. The Fig will grow in almost any soil; but if too rich, the chances are that a great production of wood and not much fruit will be the result. The best crops outside are usually secured from trees planted in a border composed of loam and brick rubbish, by the side of a hard walk, into which the roots can scarcely penetrate. If this is not practicable, they must be occasionally restricted by root-pruning, or by some other means, such as a narrow wall division under-

Fig—*continued.*

ground. Good drainage is essential, and chalk is one of the best things to use where it can be procured. An open warm position should be selected, as this, and root restriction, are important points towards encouraging the production of short-jointed, fruit-bearing wood. The climate of this country will not admit of more than one crop being ripened each year outside, and this is by no means a certain one in the majority of instances. During severe weather, the stem and branches require protection. This is afforded in various ways, some unnailing and collecting the latter in bundles, and covering with a thick coat of straw or mats. Spruce branches, fern, thatched hurdles, and canvas, may all be made to answer the same purpose. Neither is necessary, as a rule, along the South Coast, and should not be applied in other places, unless in severe weather, and then they should be removed gradually in spring.

Mode of Bearing, Pruning, &c. The fruits are produced, one or two together, in the axils of the leaves. They are formed along the branch, as growth proceeds, and, with but few exceptions, come to maturity, if at all, on new or recently ripened wood. It will thus be understood that the points of the shoots must, as much as possible, be protected from frost, and preserved when pruning. Growth seldom begins outside before May; the embryo Figs on the wood of the previous year, and new shoots for the next year, starting almost simultaneously. Fruits will also be formed along the latter, and these constitute the second crop, that ripens in some parts of the South of Europe, but in this country the summers are too short. Any fruits that are sufficiently advanced in early autumn to show the shape of the Fig, are of no use; and if these are carefully pinched off, other later ones may be formed by the side, that remain dormant with those produced nearer the points, as before explained, until the tree starts the following year. Pruning is not much required, except to keep the branches thinned; and a good deal of this, also pinching of the strongest shoots, should be seen to in summer, so as to leave only those required for fruiting. Too much pruning frequently results in the increase of soft, unproductive wood, especially if the roots are in anything like rich soil. New shoots should be encouraged from parts near the stem, where they are required to replace any that become bare or exceed their limits. Either the horizontal or the fan system of training is that usually adopted as being best suited for trees having to be grown on walls, or as espaliers. Suckers proceed in large quantities from the roots of permanent trees; these are sometimes trained about 15in. apart, and in course of time allowed to fruit. This plan is not to be recommended, as better wood may be obtained from healthy branches.

Forcing. The Fig will bear, and at all times requires, a higher temperature to start it into growth than any other fruit-trees usually forced. In gardens where a house is not specially devoted to their culture, some plants may be successfully fruited in pots, and frequently good crops are thus obtained. The supply may also be continued for a much longer period from these, by introducing a few at a time for forcing, and securing a crop from the wood of the previous year. A lean-to house admits of trees being grown both on a trellis in front, and on the back wall, the front trees being stopped so as to admit sun and light to those at the back. The roots of strong-growing varieties should be restricted by being pruned or inclosed with a narrow wall, as recommended for outside culture. The border is best made of loamy soil with a little crushed bone and mortar or charred rubbish added, this soil being also better suited for pot culture than one with more manure. When any repotting is required, it should be done when the plants are at rest; and if already in large pots, the soil and roots may be reduced, and the plants returned to a similar size. A night temperature of 50deg., and a rise by day, in mild weather, to 60deg. or 65deg., with plenty of moisture, will not be too high for starting; and as soon as the leaves are growing, and the days get longer, these figures may gradually be raised 10deg. higher. Large quantities of water are necessary in summer, and it should not be applied at a lower temperature than that of the soil in which the roots are growing. Plenty of syringing with warm water should also be practised until the fruit commences ripening, when a drier atmosphere tends to heighten the flavour. Under glass, the Fig ripens two crops if the trees are started early, the first being on the wood of the previous season, and the second on that of the current year. The new shoots should be pinched when about 9in. long, to arrest the progress of the sap, and encourage the formation and production of fruit from the axils of the young leaves. Disbudding may be practised with great advantage, as a large number of shoots are formed that cannot be allowed sufficient space to develop. Figs forced in pots should be plunged, if possible, in tan or in a bed of fermenting material, with a bottom-heat temperature of about 65deg. Liquid manure, when the fruits are swelling, may be applied to these twice or thrice a week, unless the plants are growing too strongly without. As the fruit and leaves ripen, more air should be given and water gradually withheld. When the leaves are all dropped from trees, either planted out or in pots, they must be kept quite cool, and the soil only a little moist by occasional waterings, until required to start for the next season.

Sorts. Varieties cultivated in countries where Figs are grown in quantities outside, are very numerous, but comparatively few of them have been introduced to our gardens. The following selection includes most of the best, and is, practically, large enough for all purposes. NEGRO LARGO and OSBORN'S PROLIFIC are good varieties for culture in large pots. The former must be rather severely restricted in space, if planted out, on account of its vigorous growth. BROWN TURKEY is, perhaps, the best of all for forcing, as it seldom fails to fruit abundantly under proper cultivation, and does not grow too strongly, even when the roots are not in a limited space; it is also one of the best for outside culture where Figs succeed. BRUNSWICK and WHITE MARSEILLES are two of the hardiest varieties in cultivation.

Agen. Fruit of medium size, roundish, with flattened crown; skin green, covered with blue bloom; flesh dark red, thick and syrupy. Ripens late.

FIG. 15. FIGS, BLACK BOURJASSOTTE.

Black Bourjassotte. Fruit medium, with short stalk; skin black, covered with a thick bloom; flesh deep red, thick and delicious. See Fig. 15.

Black Genoa. Fruit oblong, large; skin dark purple, with thick bloom; flesh yellow, sweet and juicy. A hardy sort, said to be much grown in Provence.

Black Ischia, or **Early Forcing.** Fruit medium, roundish-obovate; skin nearly black when ripe; flesh deep red, richly flavoured. Early and prolific.

Brown Turkey. Fruit large, short, pear-shaped, with a thick stalk; skin brown, with sometimes a purplish tinge; flesh tinged red in the middle, rich and sugary. One of the best sorts grown either for forcing or outside culture. It has numerous synonyms, including Blue Burgundy, Brown Naples, Common Purple, Italian, Large Blue, Lee's Perpetual, Purple, &c.

Brunswick. Fruit pear-shaped, very large, with short thick stalk; skin greenish-yellow, tinged with brown; flesh reddish near the middle, yellowish outside, rich and sweet. A distinct variety,

Fig—*continued.*

hardier than most others, and not suitable for forcing. It has large deeply-divided leaves.

Castle Kennedy. Fruit very large; skin greenish-yellow; flesh whitish, stained with red near the eye. Early and very prolific, suitable for walls.

Col di Signora Bianca. Fruit medium, pear-shaped, with a long neck; skin thick, yellowish-white when ripe; flesh dark blood-red, syrupy and delicious. This is considered one of the finest Figs in cultivation.

Early Violet. Fruit small, roundish; skin brownish-red, with blue bloom; flesh red, and of good flavour. A small-fruited but hardy and very prolific variety.

Grizzly Bourjassotte. Fruit round, much flattened, with a short neck; skin reddish-brown, with a thin bloom; flesh blood-red, thick, and highly flavoured.

Grosse Monstreuse de Lipari. Fruit very large and broad, flattened at the apex; skin chestnut-brown, covered with a thick bloom; flesh red, thick and juicy. A large handsome Fig, that grows and bears freely.

Negro Largo. Fruit pear-shaped, ribbed, very large and long; skin black; flesh pale red, tender, juicy, and richly flavoured. A variety of good habit when restricted at the root; one of the best for pot culture.

FIG. 16. FIG OSBORN'S PROLIFIC.

Osborn's Prolific. Fruit roundish, turbinate, with a very long neck; skin dark mahogany, shading off to pale brown towards the neck, which is green; surface of fruit thickly dotted with greyish spots; flesh milky-white, of exquisite flavour. An excellent Fig, introduced by Messrs. Osborn, of Fulham, in 1879. It is an abundant bearer, and well adapted for culture in pots. (Dr. Hogg's "Fruit Manual.") See Fig. 16.

Panachée. Fruit roundish, with a short neck; skin yellow, beautifully striped with bright green; flesh pale red inside, thick and syrupy. A handsome distinct fruit.

White Ischia. Fruit small; skin greenish-yellow, thin and delicate; flesh dark red, juicy, sweet and rich. Small-growing and a great bearer, well adapted for pot culture.

White Marseilles. Fruit large, almost round, and slightly ribbed, with a short thick neck; skin thin, pale green, nearly white when ripe; flesh almost transparent, sweet, and rich. One of the hardiest varieties, and also suitable for forcing. It has several synonyms, including Figue Blanche, Ford's Seedling, White Genoa, White Naples, &c.

FIG MARIGOLD. *See* **Mesembryanthemum.**

FIG-TREE. *See* **Ficus.**

FIGWORT. *See* **Scrophularia.**

FILAMENTOSE. Thready.

FILBERT. Among cultivated nuts, Filberts are usually distinguished by the extension of the husk beyond the point of the nut inclosed (see Fig. 17). In

Filbert—*continued.*

early spring, the male or pollen-bearing catkins (see Fig. 18, *a*) appear considerably in advance of the female

FIG. 17. FRUITING BRANCHLET OF FILBERT, the Husk being the much-enlarged Bract and Bracteole.

FIG. 18. LEAFLESS TWIG OF FILBERT, showing (*a*) Pendulous Male Catkins and (*b*) the Sessile Female Flowers.

flowers (see Fig. 18, *b*). The preservation of the former, greater or less in quantity, is essential for securing fertilisation. For culture and list of varieties, *see* **Corylus.**

FILICES. One of the most important orders of acotyledons or cryptogams. Perennial (very rarely annual) herbs, sometimes shrubby or arborescent, with fibrous roots or creeping rootstocks. Leaves (fronds) tufted or alternate on the rootstock, simple, pinnatifid,

Filices—*continued.*

or one to four-pinnate, usually circinate in vernation; petiole (stipes) sometimes jointed at the base and rachis, grooved on the upper surface. Fructification of microscopic spores, contained in usually minute capsules that are collected in masses (sori) on the under surface or edge of the frond, or rarely on separate fronds or parts of the frond, and are naked, or covered with an involucre formed of or upon the margin or back of the frond. Capsules membranous, sessile or stalked, often mixed with jointed club-shaped hairs (imperfect capsules). Spores usually obtusely tetrahedral. There are about seventy-five genera and about 2,500 species. The following genera contain the largest number of species: *Acrostichum, Adiantum, Aspidium, Asplenium, Nephrodium, Polypodium*, and *Pteris*.

FILIFORM. Slender; resembling a thread in form.

FILMY FERNS. *See* **Ferns.**

FIMBRIARIA. This genus is now included under **Schwannia** (which *see*).

FIMBRIATE. Fringed.

FIR. A general name for the conifers belonging to the genera *Abies, Larix, Picea, Pinus*, &c.

FISTULAR, FISTULOUS. Hollow, like a pipe.

FITTONIA (named in honour of E. and S. M. Fitton, authors of "Conversations on Botany"). ORD. *Acanthaceæ.* A genus containing only a couple of species of stove evergreen trailing perennials, with very brilliantly marked leaves; both natives of Peru. They are of easy culture, and thrive well in a compost of peat, loam, and silver sand; liberal supplies of water and a shady situation are necessary elements to successful cultivation. Increased by cuttings of half-ripened shoots, planted in sandy loam, in bottom heat; also by divisions of the plant. As ornaments for a Wardian case, Fittonias are unequalled; and when grown as pyramids, they form beautiful objects in the stove. For planting upon the surface of the pots or tubs in which palms or other large specimens are growing, they are very useful, and also for forming narrow borders as edges to the walks in heated structures.

F. gigantea (gigantic).* *fl.* pale red, in a terminal four-sided spike, with large bracts. *l.* broadly ovate, sub-cordate, veined with carmine-red. *h.* 1½ft. Habit branching, erect, sub-shrubby. 1869. See Fig. 19. (R. G. 629.)

F. rubronervum (red-nerved). A synonym of *F. Verschaffeltii.*

F. rubrovenosum (red-veined). A synonym of *F. Verschaffeltii.*

F. Verschaffeltii (Verschaffelt's).* *l.* larger than those of *F. gigantea*, dark green; midrib and veins deep red. An elegant

FIG. 19. FITTONIA GIGANTEA.

species. SYNS. *F. rubronervum, F. rubrovenosum.* (I. H. 372, under name of *Gymnostachium Verschaffelti.*)

F. V. argyroneura (silvery-veined).* *l.* broad, flat, oval, about 4in. long, and nearly 3in. wide, vivid green, traversed by a network of pure white veins. Habit dwarf and compact. 1867.

F. V. Pearcei (Pearce's).* *l.* about 3in. or 4in. long, 2in. or 3in. broad, light bright green; midrib and veins light bright carmine; under surface somewhat glaucous.

FISCHERIA (named after Dr. Fischer, of St. Petersburgh). ORD. *Asclepiadeæ.* A genus comprising about twelve species of stove twining shrubs or sub-shrubs, natives of tropical and sub-tropical America. Flowers white or dull red; cymes umbelliform or shortly racemose. Leaves opposite. In all probability, the two species described below are the only ones yet in cultivation. They thrive in a peat and loam compost. Propagated by cuttings, inserted in light open soil, in heat. This genus is often confused with *Gonolobus.*

F. hispida (hairy). *fl.* brown, umbellate; corolla coriaceous, tubercled inside at base. July. *l.* cordate-ovate, acute. Stem, petioles, and nerves of leaves hispid. *h.* 4ft. Brazil, 1837. (B. M. 3786, under name of *Gonolobus hispidus.*)

F. Martianus (Martius's). *fl.* white, green; umbels many-flowered, on long peduncles; lobes of corona fleshy and rounded. May and June. *l.* oblong-cordate. *h.* 30ft. Brazil, 1845. (B. M. 4472, under name of *Gonolobus Martianus.*)

FISH-BONE THISTLE. *See* **Chamæpeuce Casabonæ.**

FITZROYA (named after Capt. R. Fitzroy, R.N., commander of a surveying expedition; died 1855). ORD. *Coniferæ.* A genus containing a couple of species of dwarf evergreen trees, with imbricated scale-like leaves; one (from Patagonia) is sufficiently hardy to withstand our winters in exceptionally favoured spots. They do well in almost any garden soil, and are readily propagated by means of seeds, or by cuttings of half-ripened branchlets. *F. Archeri* makes an interesting and handsome cool conservatory plant.

F. Archeri (Archer's). *fl.* diœcious, the amenta terminal. *male cones* erect, one to two lines long, scarcely thicker than the branchlets with their leaves. *young female cones* purplish in the

Fitzroya—*continued.*

dried state, about one line long and broad. *l.* closely imbricate, but strictly opposite and decussate, very obtuse, thick, and keeled. Tasmania. An erect, densely branched shrub. SYN. *Diselma Archeri.*

F. patagonica (Patagonian). *fl.* monœcious, small, consisting of nine scales in three whorls, the upper and lower of which are barren. *l.* small, ovate-oblong, flat, obtuse, sessile, two to four-rowed. Branches slender, spreading, incurved at the extremities. Tree. Patagonia. (B. M. 4616.)

FLABELLIFORM. Plaited like a fan.

FLACCID. Feeble, weak.

FLACOURTIA (named after Etienne de Flacourt, 1607-1661, a Director of the French East India Company). ORD. *Bixineæ.* A genus comprising about a dozen species of fruit-bearing, often thorny, stove trees or shrubs, from the warmer regions of Asia and Africa. Stamens densely crowded upon the hemispherical receptacle; the sepals whitish, and the stamens and anthers yellow. Fruit baccate, indehiscent. Leaves shortly stalked, dentate. The species are rarely seen in cultivation.

FLACOURTIEÆ. A tribe of *Bixineæ.*

FLAGELLIFORM. Long, tapering, and supple, like the thong of a whip.

FLAGELLUM. A runner, like that of the Strawberry; also a thin twig or small branch.

FLAME FLOWER. *See* **Kniphofia aloides.**

FLAT-BODY MOTH, COMMON (*Depressaria cicutella*). In this moth, like the rest of the genus, the body seems depressed, hence the common name. The fore wings are pale ochreous-reddish, irregularly freckled with brown and black specks; a pale mark runs from the base along the front edge, and two or three white dots, in black rings, are seen towards the middle; the whole having a glossy appearance. The hind wings are shining, but more grey, and without markings. The common Flat-body Moth produces two, or perhaps more, broods in a year. The caterpillars are found in June, and again in September, and the moths in August and November; the latter live in a dormant state through the winter, and re-appear in the spring. Two or three species of this genus, very similar in appearance and habit, infest the leaves, flowers, and seeds of Carrot crops, sometimes doing considerable damage. The other kinds are *D. daucella* and *D. depressella.* *See* **Carrot Blossom Moth** and **Purple Carrot-seed Moth.**

Remedies. The larvæ draw the leaves or flower-heads together by means of silken threads, which make their domicile very conspicuous. These may be gathered and destroyed; but as the caterpillar is likely to wriggle out and drop, by means of a silken thread, at the moment the plant is touched, some receptacle should be placed under the curled part before attempting to pluck it off. Solitary wasps, and insectivorous birds, are very useful in clearing away these small grubs.

FLAVERIA (from *flavus*, yellow; in reference to the plants being used in Chili to dye that colour). ORD. *Compositæ.* A genus comprising about seven species of herbaceous plants. Flower-heads yellow. Leaves opposite, narrow, entire or dentate. Probably the only species cultivated in England is the one described below. It is a greenhouse herbaceous biennial, thriving in sandy loam. Propagated by seeds, sown in heat.

F. contrayerba (Contrayerva). *fl.-heads* yellow, terminal. July to September. *l.* somewhat stalked, lanceolate, three-nerved, mucronate-serrate. *h.* 1½ft. Peru, 1794. (B. M. 2400.)

FLAVESCENT. A pure pale yellow.

FLAX. *See* **Linum.**

FLAX, NEW ZEALAND. *See* **Phormium tenax.**

FLAXWORTS. A name for the order *Linaceæ.*

FLEABANE. *See* **Conyza.**

FLEA BEETLE. *See* **Turnip Fly.**

FLEXUOUS. Having a bent or undulating direction; zigzag.

FLINDERSIA (named after Capt. M. Flinders, R.N., 1780-1814, who explored the coast of Australia, accompanied by the famous botanist, Robert Brown). ORD. *Meliaceæ.* A genus of about four species, natives of tropical and sub-tropical Australia and the Moluccas. They are stove or greenhouse evergreen trees or shrubs, succeeding in a compost of loam and peat. Cuttings, with leaves intact, will root in sand, under a glass.

F. australis (Southern). *fl.* white, small, numerous, panicled. May. *l.* impari-pinnate; leaflets one to three pairs, full of pellucid dots, as in the Orange. *h.* 60ft. Queensland, 1823. The wood is useful for various domestic purposes, and is said to be not much inferior to mahogany. Greenhouse.

FLOCCOSE. Covered with close woolly hairs, which fall away in little tufts.

FLORAL. Of or belonging to a flower; near a flower.

FLORAL ENVELOPES. The calyx and corolla, which envelop the inner or reproductive parts of a flower, are so called.

FLORETS. Little flowers; chiefly applied to composites and grasses.

FLORIFEROUS. Bearing flowers.

FLORISTS' FLOWERS. This term is applied to a very large section of mostly greenhouse and hardy plants, abounding in varieties and garden forms that have originally descended from a limited number of species of each of the numerous genera included. The Florist is one who specially devotes his attention to the improvement of such plants as admit of it, either by cultivation, careful selection, or systematic hybridisation. The superiority, both in habit of plant, and form and variety in colour of flowers, is apparent in almost every subject that has been taken in hand. In many cases, where it is thought perfection has been well-nigh reached, a new break appears in some way, and thus fresh material is given the Florist on which to effect an improvement. The number of plants included amongst Florists' Flowers is continually extending, as, apart from increasing and perpetuating new varieties of a superior type, other genera, that have hitherto been neglected, are brought under the same influence, with a view of eventually obtaining a similar result. Perfection in habit and in form of flower, with distinct colouring, are points always to be aimed at, and only those flowers which are best in these respects should be used for seeding purposes. It is invariably necessary to perpetuate varieties of Florists' Flowers by cuttings or offsets, as the case may be, seeds having a tendency to produce plants of a mixed and inferior quality to those from which they were collected. The Florist's standard for quality and good culture is now of a high character with many plants, and is beyond the reach of the majority of cultivators. The advantages of the improvements effected are, however, available for all in the select varieties annually distributed, or those in general cultivation. The Auricula, Carnation, Chrysanthemum, Dahlia, Fuchsia, Gladiolus, Hyacinth, Pelargonium, Tulip, &c., may be cited as some of the most popular and best known examples, each and all exhibiting evidence of the success attending the Florist's work.

FLOWER. In phanerogamic plants, the Flower is a collection of several whorls (usually four) of modified leaves. The calyx is the outer whorl, the corolla the second, and the stamens and pistil the third and fourth.

FLOWER BORDERS. *See* **Borders, Flower.**

FLOWER BUDS. *See* **Buds, Flower.**

FLOWER-DE-LUCE. An old English name for the common species of **Iris** (which *see*).

FLOWER FENCE. *See* **Poinciana.**

FLOWER GARDEN. *See* **Garden.**

FLOWERING ASH. *See* **Fraxinus Ornus.**

FLOWERING RUSH. *See* **Butomus umbellatus.**

FLOWER OF JOVE. *See* **Agrostemma flos-Jovis.**

FLUEGGEA. *See* **Ophiopogon.**

FLUES. The system of fixing Flues for heating purposes in glass structures is now become nearly obsolete, the better and more effective mode of heating by hot water being almost exclusively adopted. In the earlier days of gardening, the use of Flues was general, and even now many remain and continue to answer their purpose exceedingly well, both for fruit and flower cultivation. Flues may be constructed of bricks, and covered with thick flat tiles or slates, placing a cross piece of sheet iron under each joint; or large pipes may be employed with good results, if properly connected. Fire bricks should be used near the furnace, and the Flue proceed from here round the front part of the house first, returning at the back, or terminating in a chimney at the end, according to the amount of heat required. Corners should be turned by a curve, to allow the heated air and gases to pass more freely, and consequently prevent cracking of the joints. The whole of the heat transmitted to the house must pass through the material used in the construction of the Flue; and all holes or cracks should be kept stopped, to prevent the escape of smoke and injurious gases. It is very important that Flues be kept cleaned out, as a coat of soot prevents the absorption and free passage of heat, and is also an obstruction to the draught. The furnace is best near one end of the house. It should be placed about 2ft. below any part of the Flue, and a gradual ascent allowed the latter until the chimney is reached.

FLUGGEA (named in honour of John Flugge, a German cryptogamic botanist). Ord. *Euphorbiaceæ.* A genus comprising several species of much-branched smooth shrubs, found in most tropical countries of the Eastern hemisphere. Flowers green, minute, and disposed in fascicles or cymes in the axils of the leaves. Berry about the size of a pea, or smaller. Leaves entire, obovate or ovate. In all probability, the species here described is the only one yet introduced. It succeeds in a rich mould and in a moist stove. Propagated by cuttings.

F. leucopyrus (white-fruited). *fl.* apetalous. Berries white, edible. *l.* alternate, orbicular, ovate, entire, smooth; spines 2in. to 3in. long, very strong and numerous, whitish. East Indies, 1825.

FLY HONEYSUCKLE. *See* **Lonicera Xylosteum.**

FLY ORCHIS. *See* **Ophrys muscifera.**

FŒNICULUM (the old Latin name). Ord. *Umbelliferæ.* A genus containing three or four species of hardy biennial or perennial, often tall herbs. Flowers yellow, in compound umbels, without involucres; petals entire, inflected at the top, but not pointed. Fruit oval. Leaves pinnate, decompound, finely dissected. For culture, *see* **Fennel.**

F. dulce (sweet).* This is considered by some authorities to be but a variety of *F. vulgare.* It differs, however, in the plant being smaller; in the stem being compressed, not round, at the base; in the smaller number of rays to the umbel, &c. It is cultivated in this country as a pot herb. Biennial.

F. officinale (officinal). A synonym of *F. vulgare.*

F. vulgare (common).* Common Fennel. *fl.* yellow, in rather large umbels. Late summer and autumn. *l.* three or four times pinnate, with very narrow, linear or subulate segments. Stems erect, branched. South Europe; occurring in many parts of Britain. Perennial. Syn. *F. officinale.* (Sy. En. B. 601.)

FŒTIDIA (from *fœtidus*, stinking; in allusion to the smell of the wood). Ord. *Myrtaceæ.* A genus containing three species (perhaps these are merely varieties of one) of glabrous trees, having a tough, bitter bark. Peduncles axillary, solitary, one-flowered. Leaves alternate, elliptic or oblong, entire, penninerved. *F. mauritiana* is an ornamental greenhouse evergreen tree, allied to **Gustavia** (which *see* for culture).

F. mauritiana (Mauritius). *fl.* solitary; peduncles in the axils of the upper leaves; petals wanting; tube of calyx tetragonal and hemispherical; lobes valvate in æstivation, permanent, at length reflexed. *l.* alternate, crowded on the branches, sessile, oval, entire, obtuse. *h.* 15ft. to 20ft. Mauritius, 1827.

FOLIACEOUS. Having the form of leaves.

FOLIOLATE. When a leaf is divided into leaflets, it is called One, Two, Three, Ten, or Twelve-foliolate, according to the number of leaflets.

Fig. 20. Follicle of Delphinium.

FOLIOLE. A leaflet; the secondary divisions of a compound leaf.

FOLLICLE. A kind of fruit consisting of a single carpel, dehiscing by the ventral suture only. See Fig. 20.

FONTANESIA (named in honour of M. René Louiche Desfontaines, 1750-1833, author of "Flora Atlantica," and several other works). Ord. *Oleaceæ.* An ornamental, hardy sub-evergreen shrub, resembling the common Privet, but with rough bark, and graceful, slender, drooping branches. It thrives in ordinary soil. Increased by layers; by cuttings, planted under a hand glass, in autumn; or by grafting on the Privet. In all probability, the two plants here described are but forms of one species.

Fig. 21. Flowering Branch of Fontanesia Fortunei.

F. Fortunei (Fortune's). *fl.* creamy-yellow, in axillary and terminal panicles. *l.* lanceolate, entire, long-acuminated, glossy green above, paler beneath. China. See Fig. 21. (R. H. 1869, 43.)

F. phillyræoides (Phillyrea-like). *fl.* creamy-yellow, in axillary racemes. August. *l.* lanceolate, acute at both ends. *h.* 10ft. to 14ft. Syria, 1787. This species has the habit of *Phillyrea media.* (L. B. C. 1308.)

FOOTSTALK. The stalk of a leaf.

FORCING. This is one of the most important operations in the whole routine of gardening, and one that requires the greatest care in practice for obtaining successful results. It has to be mainly conducted throughout the winter and early spring, when outside temperatures are extremely variable, and when the amount of sunshine and consequent light obtained is, at best, but very limited. Forced flowers, fruits, and vegetables, are annually in demand, and all have to be procured under conditions that are generally unnatural to the plants at the time, in consequence of an insufficient season of rest being allowed them. Fruit-trees carefully forced in successive seasons, and properly ripened after the fruit is gathered, finish their growth, and begin a season of rest, earlier than those allowed to grow more in accordance with their natural habit. These start the more readily, in consequence, when artificial heat is applied. Many flowering plants are so far injured by early Forcing, as to be unavailable for the purpose the following year; but they may generally be recruited in health, in the course of two seasons, by planting out, and, in the meantime, using others that have been prepared in a similar way. The preparation of plants for Forcing, or selection of those only which are thoroughly ripened, is always one of the most important points. A fruit-tree, or flowering plant, thus treated will have its embryo flowers formed inside the bud-scales, and ready for expanding when the necessary heat and moisture are given. In the early stages of Forcing operations, heat should be applied as gradually as possible, beginning with a little warmer, closer atmosphere than that allowed during the resting period. A temperature not exceeding 50deg. to 55deg. by artificial heat will suit a large number of plants to start with, but these figures must not be taken as applying to all alike—they would be too high. Most plants subjected to Forcing will bear more heat after the buds swell and commence growing, than they will previously. The value of sunshine and light cannot be over-estimated; consequently, both should be admitted to the fullest extent in winter, when the sun will seldom be strong enough to injure the tenderest foliage. It is not advisable to apply heat, when the weather is dull, to maintain a temperature equal to that supplied naturally on brighter days, as the result would be an encouragement of weak, attenuated growths, which, with a return of sun, or an admission of air, would immediately droop. Very early Forcing renders many plants and vegetables useless afterwards, and this necessitates an annual supply being raised for the purpose. Almost any positions in heated structures may be utilised for such, as, once the crop is secured, in the case of either flowers or vegetables, the roots may be destroyed, and their place taken by others. Vines, and fruit or other permanent trees, are of much more consequence; hence, the greatest care is necessary, in Forcing, not only to conduct it so as to gain a crop the following season, but also to avoid doing anything that may prove injurious to the well-being of the trees afterwards. A ridge of fermenting material, composed of fresh stable litter and plenty of leaves, is frequently used, with good results, for starting early Vines or Peach-trees. It requires to be often turned and renewed, in order to keep the requisite temperature, which, supplied in this way, contains much more moisture than would be procurable with the aid of fire heat. The hot-water pipes must, however, be available for use as well at any time required.

FORCING HOUSE. The quantities of cut flowers and plants required in many gardens, render it a necessity to either build or set apart a special structure for forcing purposes, with provision for those subjects needing bottom heat, and a bed or staging for others that are better without. A Forcing House is also, sometimes, specially reserved

Forcing House—*continued.*

for such plants as Strawberries, where they are placed in a high temperature, after flowering is over, for the purpose of swelling and maturing the fruit. A span-roofed building is most suitable for accommodating plants of various heights, and is, at the same time, one that admits most light. If provided with a glass partition, and separate valves in the heating arrangements, an advantage is gained of keeping one part a little cooler than the other, and introducing plants into this when first starting them. The Forcing House should be in a sheltered position in the garden, but not so as to be shaded in winter; and it should have plenty of heat at command. A span-roofed structure admits of a centre stage with path round, and side beds under which pipes could be placed for bottom heat; or, in the case of a small one, the path may be through the centre, and beds arranged on either side. All plants may be stood near the light, in a house of this description, by raising or lowering them according to height, but this condition could not be procured so readily in one of another shape. Stronger and more equable bottom heat is obtained when the pipes pass through a shallow water tank underneath the plunging material. A span-roofed house, about 30ft. long, 16ft. wide, and 9ft. high, would allow considerable space for plants of various sizes, and would be most desirable for other purposes, when not required for forcing. A minimum temperature of from 50deg. to 55deg. is preferable to a higher one for starting most flowering plants not requiring bottom heat. This may be raised 10deg. after growth commences. Much must depend, in forcing, on the condition of the weather outside. Light syringings, with water as warm as the house, may be given on bright days, and all possible sun heat should be retained in the winter and early spring months, when forcing operations are of the greatest importance. The admission of air by the ventilators must be conducted with great care, when it becomes necessary to open them, on account of the tender foliage or flowers. A change of air takes place continually between the laps of the glass, particularly when the outside temperature is much lower than that inside. Fire heat should be stopped in the day-time, so soon as the sunshine is strong enough to give sufficient warmth without it.

FORFICULA AURICULARIA. *See* **Earwigs.**

FORGET-ME-NOT. *See* **Myosotis palustris.**

FORK. This is one of the most useful of garden implements, made in various sizes and shapes to specially suit the work for which any particular one is intended. Those with two prongs are best for light litter, and for mixing manure, &c. The four, and sometimes five-pronged Forks are those mostly used, being frequently more serviceable for digging or levelling down soil than the spade. It is an indispensable tool for removing earth from the roots of trees or shrubs when transplanting, as, if carefully worked from the stem outwards, the soil is loosened,

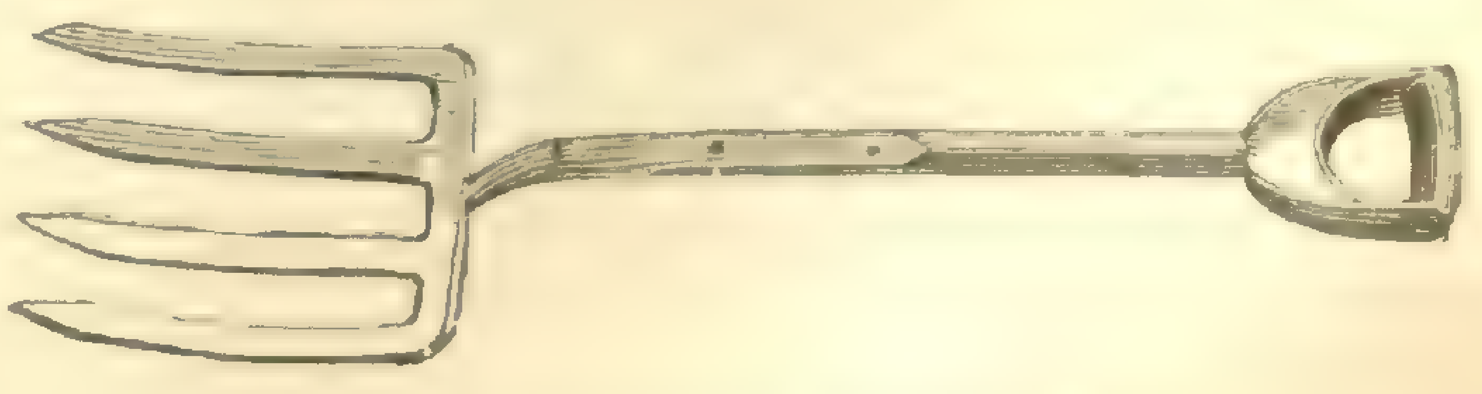


FIG. 22. FLAT-TINED DIGGING FORK.

and the roots uninjured in the process. The Fork is not in general use for digging, as it does not so thoroughly remove the earth at the bottom as the spade; but in many cases where the latter cannot, for various reasons, be properly worked, the former will be found a certain substitute. A good form for ordinary kitchen garden work, and for lifting crops, such as Potatoes, &c., is that made with four flattened prongs (see Fig. 22). The quality of the steel, with the proper mode of manufacturing the

Fork—*continued.*

implement, is of much more importance when purchasing than the difference in price would suggest; consequently, those from the best makers should be obtained. Some are easily bent when under pressure: others just as easily snap. A good Fork should be made of steel, so combined in the manufacture as to wear evenly, and in such a way that the prongs will neither snap nor bend when in ordinary use. Forks for loading leaves are specially made with four or five long tines, and are very useful in winter where large quantities have to be collected and taken away. Hand Forks are useful for plunging, planting out, &c.; they are made with three short flattened prongs, and a handle of the same size, like that of a trowel.

FORMICIDÆ. *See* **Ants.**

FORNICATE. Arched.

FORRESTIA (commemorative of Peter Forrest, a botanist of the seventeenth century). ORD. *Commelinaceæ.* A genus of seven species of pretty and singular stove perennials, of which one is from tropical Africa, and the rest natives of India and the Malayan Archipelago. For culture, *see* **Commelina.**

F. Hookeri (Hooker's). *fl.* purplish, capitate, sessile, bracteate, in dense clusters from the lower sheaths, and often from the naked stems after the leaves have fallen; sepals boat-shaped; petals much paler, almost white, ovate, acute. *l.* sub-succulent, obovate-lanceolate, finely cordate-acuminate, more or less hairy, deep purple beneath, at length glabrous above, and there uniformly green, striately veined; base tapering downwards, often very hairy, and terminating in a large, striated, often very villous, sheathing base. Stem herbaceous, 1ft. to 3ft. long, simple below, creeping and radicant, and leafless. *h.* 3ft. Malay Archipelago, 1864. (B. M. 5425, under name of *F. hispida.*)

FORSYTHIA (named in honour of William Forsyth, 1737-1804, the King's Gardener at Kensington, author of "Observations on the Diseases of Trees," London, 1791). ORD. *Oleaceæ.* Very ornamental hardy dwarf deciduous shrubs. Flowers yellow, drooping, solitary. Leaves simple or compound, glabrous. Branches slender. For culture, *see* **Fontanesia.**

FIG. 23. FLOWERING BRANCH OF FORSYTHIA SUSPENSA.

F. suspensa (hanging-down).* *fl.* yellow, few, scattered, on very slender branches; peduncles slender. *l.* simple and trifoliolate on the same branch, toothed; central leaflet largest. Japan and China. This is a very graceful shrub, which does thoroughly well either as a climber against a wall, or treated as a bush in the open shrubbery border; it also forces readily. In nurseries, it is frequently met with under the names of *F. Fortunei* and *F. Sieboldi.* See Fig. 23. (S. Z. F. J. 3.)

F. viridissima (very green).* *fl.* yellow, numerous; peduncles much shorter than the flowers, bracteolate. March. *l.* all simple, entire, linear-lanceolate or oblong, acute. *h.* 10ft. Japan, 1845. (B. M. 4587.)

leaves serrate at top
Seedonder Envy Plants

FORTUNEA. A synonym of **Platycarya** (which *see*).

FOTHERGILLA (named in honour of John Fothergill, 1712-1780, an eminent physician and patron of botany). ORD. *Hamamelideæ.* The only species of this genus is a pretty hardy deciduous shrub. It thrives best in a moist sandy peat; and may be increased by seeds, which should be sown in spring, in a peaty soil. The varieties may be propagated by layers.

F. alnifolia (Alder-leaved).* *fl.* white, sweet-scented, sessile, spicate, terminal, ovate, appearing before the leaves. April, May. *l.* alternate, obovate, stipulate, clothed with soft, starry down. *h.* 3ft. to 6ft. North-eastern America, 1765. The following are varieties:

F. a. acuta (acute). *l.* narrow, ovate, acute.

F. a. major (greater). *l.* ovate-oblong, somewhat cordate at the base. (B. M. 1342.)

F. a. obtusa (blunt-leaved). *l.* obovate, crenate at the top, when young downy beneath. (B. M. 1341.)

F. a. serotina (late-flowering). *l.* oblong, acute, crenately toothed at top.

FOUNTAINS. In connection with garden, conservatory, and room decorations, Fountains are represented in various forms, and are constructed in sizes varying from specimens of the most minute description in a room, to an enormous display of waterworks, as shown in extensive public gardens and other establishments. An important point in the introduction of a Fountain is the selection of a situation that is at once appropriate and in keeping with surrounding objects. The centre of an inclosed flower garden, of a formal description and geometrically laid out, could not, perhaps, be better occupied than with a Fountain and circular basin, having a walk round it in connection with other cross walks formed at right angles. Intersecting points are best in any case, on account of the means thereby supplied of utilising the water from the basin. Either a single jet or an indefinite number, if desired, must be in connection with an elevated reservoir or other source of supply from which a force can be obtained, and they may be fixed so as to conduct the water in various directions, and cause it to disperse and descend in minute particles. The jets are best arranged amongst a pile of rockwork or large stones, that help to conceal them from view when the water is stopped. A Fountain has a cooling effect in a conservatory, in summer; and when constructed in a prominent position, as in the centre, it is invariably a source of attraction. In some of the most extensive and beautiful summer floral decorations, a small Fountain is introduced, with flowers of various Nymphæas, &c., dropped in the water beneath. This forms an interesting and novel addition, and one that is generally much admired.

FOUQUIERA (named in honour of Peter Edward Fouquier, M.D., a French physician). ORD. *Tamariscineæ.* A genus containing three species of very glabrous, spinose trees or shrubs, natives of Mexico. *F. formosa* is described as being a very showy stove shrub. It thrives in a loamy and fibry peat; and is increased by cuttings, planted in heat, under a bell glass.

F. formosa (splendid).* *fl.* scarlet, 1in. long, disposed in terminal erect spikes; corolla tube cylindrical, a little arched; limb spreadingly reflexed. *l.* oblong, scattered, rather fleshy. *h.* 6ft. to 10ft. See 1900 Suppl. p. 371 for Columnaris &

FOUQUIEREÆ. A tribe of *Tamariscineæ.*

FOURCROYA. *See* **Furcræa.**

FOX-BANE. *See* **Aconitum vulparia.**

FOXGLOVE. *See* **Digitalis.**

FRAGARIA (from *Fraga*, the old Latin name, from the same root as *fragrans*, fragrant; referring to the perfume of the fruit). Strawberry. ORD. *Rosaceæ.* A genus of three or four species of hardy (except where otherwise stated) perennial scapigerous herbs, with runners, natives of North temperate regions, the Andes, Sandwich Islands, and Bourbon. Flowers white or yellow, honeyed, often polygamous; achenes many, minute, embedded on the surface of the large convex fleshy receptacle. Leaves three-foliolate (in the British species), pinnate or one-foliolate. Several of the so-called species have, without doubt, originated from two or three; many of them, however, preserve a well-marked character. For cultivation, *see* **Strawberry.**

FIG. 24. FRAGARIA CHILENSIS (CHILI STRAWBERRY).

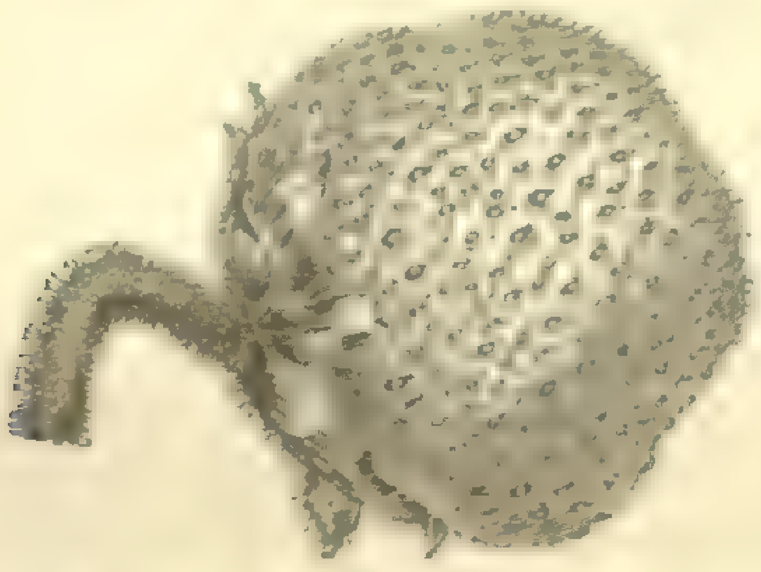


FIG. 25. FRUIT OF FRAGARIA CHILENSIS.

F. chilensis (Chilian).* *fl.* white; sepals erect; peduncles thick and silky. April and May. *fr.* rose-coloured, flesh white, pendulous. *l.*, leaflets obovate, obtuse, serrated, coriaceous, wrinkled, silky beneath. *h.* 1ft. South America, 1727. See Figs. 24 and 25.

F. c. grandiflora (large-flowered).* Pine Strawberry. *fl.* white; sepals reflexed; peduncles thick. April and May. *fr.* red. *l.*, leaflets glaucous, coriaceous, broadly crenated, pilose beneath. *h.* 1ft. 1759. See Figs. 26 and 27.

F. collina (hill). Green Pine. *fl.* white; sepals, after flowering, erect. April to June. *fr.* green. *l.*, leaflets plicate, thin, silky above and pilose beneath. *h.* 9in. Europe, 1798.

F. elatior (taller). Hautbois. *fl.* white; sepals at length reflexed on the peduncles. April and May. Receptacle firm, adhering but little to the calyx. *l.*, leaflets plicate, rather coriaceous, green. *h.* 1ft. Europe. This, which is much larger than *F. vesca*, is probably derived from that species; it is frequently met with as a garden escape in a semi-naturalised condition in Britain. (Sy. En. B. 439.)

F. indica (Indian).* *fl.* golden-yellow; calyx ten-parted, outer five segments accessory, large, foliaceous, tridentate at the apex, and spreading; peduncles axillary, solitary, one-flowered. May to October. *fr.* red, insipid, numerous. *l.* trifoliolate; leaflets cuneate-ovate, deep green, crenated. India, Japan, &c., 1805. A very pretty little greenhouse trailer. (A. B. R. 479.)

Fragaria—*continued.*

FIG. 26. FRAGARIA CHILENSIS GRANDIFLORA (PINE STRAWBERRY).

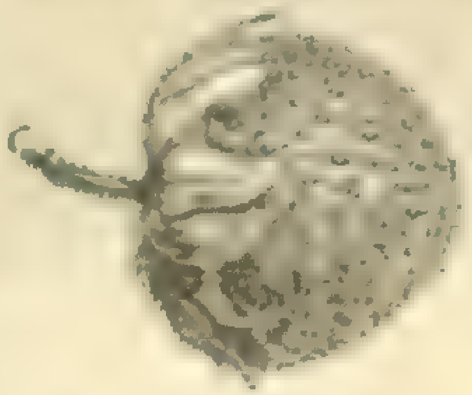


FIG. 27. FRUIT OF FRAGARIA CHILENSIS GRANDIFLORA.

F. vesca (edible). Common Wild Strawberry. *fl.* white; sepals at length reflexed. April and May. *fr.* pendulous. *l.*, leaflets plicate, thin, pilose beneath. *h.* 6in. to 12in. Britain. See Figs. 28 and 29. (Sy. En. B. 438.)

FIG. 28. FRAGARIA VESCA (WILD STRAWBERRY).

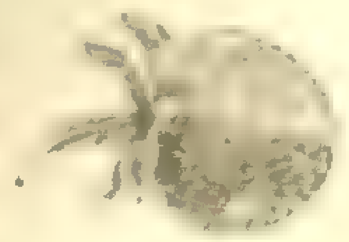


FIG. 29. FRUIT OF FRAGARIA VESCA.

F. v. monophylla (one-leaved). Alpine Strawberry. *fl.* white. May. *fr.* round, small, pendulous; receptacle elongated, red. *l.* simple, crenately toothed. *h.* 6in. Europe, 1773. (B. M. 63.)

F. virginiana (Virginian). Scarlet Strawberry. *fl.* white; peduncles and pedicels length of leaves. April. *fr.* deep red when ripe; receptacle very tumid, pendulous. *h.* 1ft. North America, 1629.

FRAMES, GARDEN. Frames are portable garden structures among the most useful for various purposes at all seasons, particularly in spring and early summer, when large quantities of different subjects have to be prepared for transplanting outside. They may also be effectively employed in forcing operations, where pits are limited, by being placed on a hotbed of fermenting material, and covered with mats and dry litter, according to the state of the weather, or the amount of heat required inside. Cucumbers and Melons, and a large proportion of greenhouse winter-flowering plants in pots, as well as those for more immediate use, may be successfully cultivated in Frames during the summer. In winter, the latter may be utilised for storing plants that merely require protection from frost, by placing a quantity of dry litter round the woodwork, and covering the glass with mats, &c. Frames are made of different sizes, none being so generally useful as those having two sashes, each measuring about 6ft. long by 4ft. wide (see Fig. 30, for which, and for Fig. 31, we are indebted to Messrs. Boulton and Paul, of Norwich), or others large enough to take three sashes of similar dimensions. The frames of these sashes should be 2in. thick, and each fitted with an iron handle for opening, and a cross bar of iron for strengthening them. The Frame or box itself is usually made of deal timber, 1¼in. or 1½in. thick, a height of 18in. being allowed at the back, and 13½in. at the front, or other heights may be adopted in a similar proportion. The corners should be dovetailed,

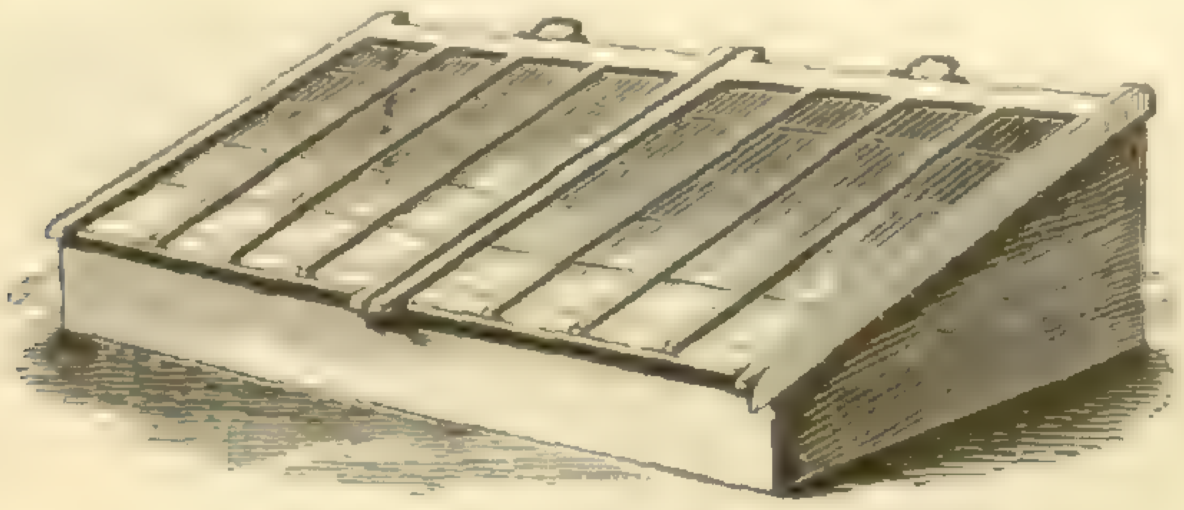


FIG. 30. TWO-LIGHT FRAME.

and further strengthened by pieces of wood fitted inside. Frames may be purchased ready for use, but they are expensive, and seldom so strong as those which can be made at home, somewhat like that above described. A new Three-quarter Span-roof Frame, made by Messrs. Boulton and Paul, of Norwich, is represented in Fig. 31. When made in this shape, it has the advantage of giving more height inside than with the ordinary sashes. The sashes here shown are hung to the ridge in such a way that

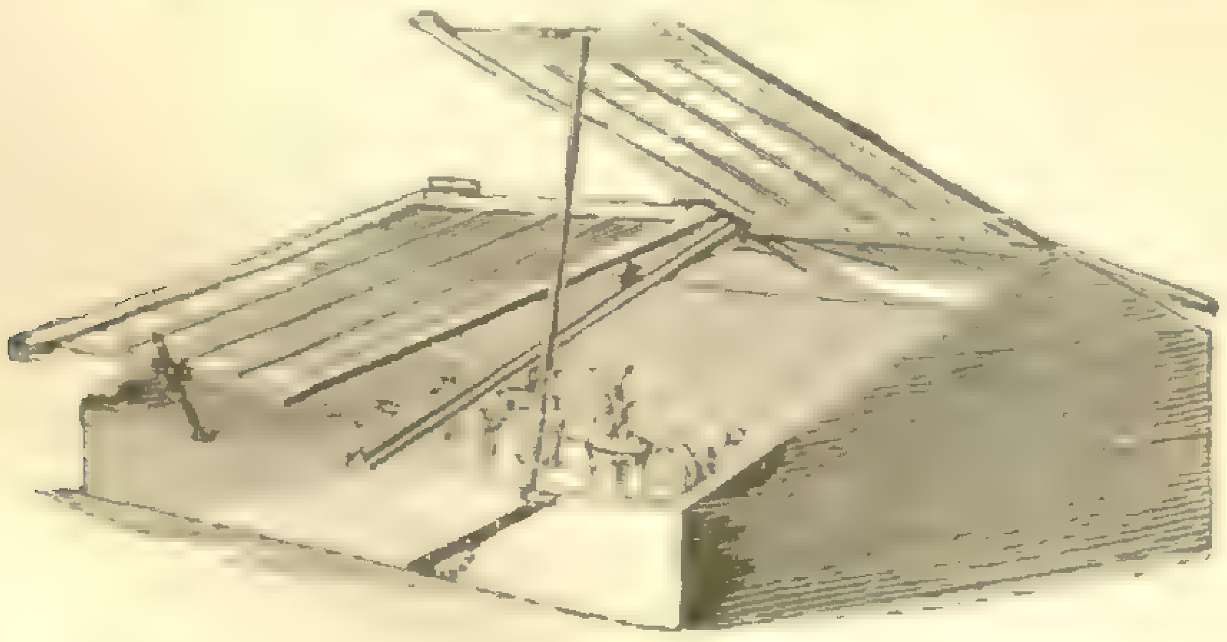


FIG. 31. THREE-QUARTER SPAN-ROOF FRAME.

the front ones may be turned right over on the others at the back, and the reverse. An iron prop accompanies each Frame, to hold the lights wide open for attending to the plants, and each light is provided with a fastening that serves the double purpose of securing it against wind, and raising it for ventilation. Like the ordinary Frames, these are made in various sizes. Other sorts may be procured with iron standards and framework, the

Frames, Garden—*continued.*

sashes being made of wood, and glazed in the ordinary way, or without putty. One of the most popular and best-constructed of this description is that made by Messrs.

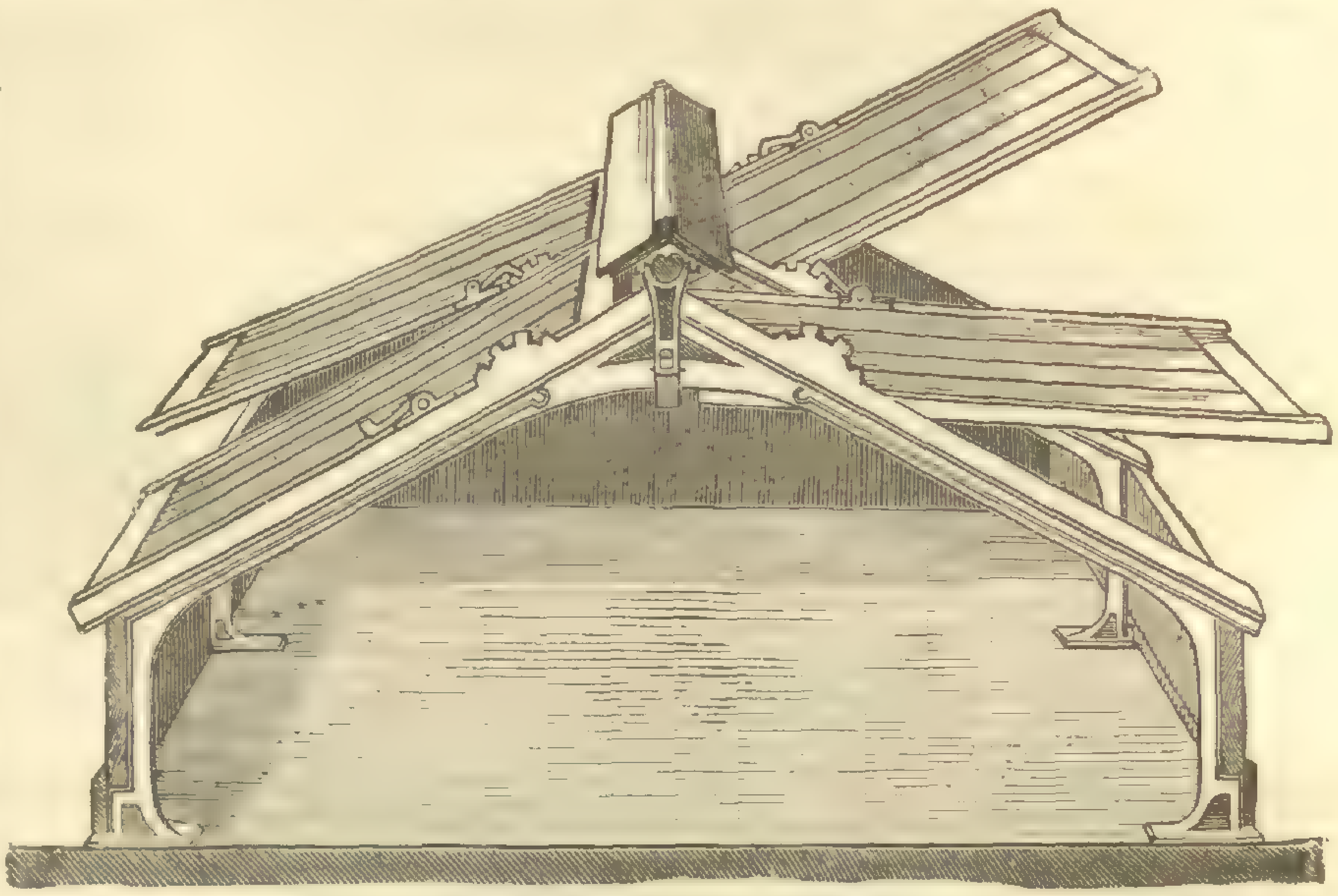


FIG. 32. SPAN-ROOF FRAME.

Foster and Pearson, Nottingham (see Fig. 32). A somewhat novel, but effective, mode of ventilation is adopted. The sashes are held open at any angle required, by dropping a stout hook, attached to each, into a contrivance cast in the iron rafters, something like part of a cog-wheel. This holds them safely in any position in which they are placed. The sashes may easily be removed and replaced, if desired; and the ridge is made to lift up and down its whole length by a lever, as a means of ventilation in wet weather. Where expense in purchasing is no object, Frames like this are very useful and durable. They are best suited to remain where placed permanently. For sectional representations of simple and chambered Frames, *see* **Cucumber.**

FRANCISCEA. *See* **Brunfelsia.**

FRANCOA (named in honour of F. Franco, M.D., of Valentia, a promoter of botany in the sixteenth century). ORD. *Saxifrageæ.* A Chilian genus, all the species of which are described below. They are very handsome hardy or half-hardy perennials, beset with simple hairs or glands. Flowers terminal, copious, in spicate racemes. Leaves lyrate, nearly like those of the Turnip, reticulately veined. Seeds should be sown, about February or March, in a well-drained pan of sandy peat, covered over with a pane of glass, and in a heat of about 50deg. The glass covering may be removed when the seedlings have made a little growth. So soon as the plants are large enough to handle, they should be transferred to other pans, at a distance of about 2in. apart. About April or May, they may be potted off into 4in. pots, and placed in a cool greenhouse or frame. Increased also by divisions.

F. appendiculata (appendaged).* *fl.*, petals pale red, marked each by a deeper spot near the base; scape nearly simple; racemes compact. July. *l.* petiolate, lyrate. *h.* 2ft. 1830. (B. M. 3178; misnamed *F. sonchifolia* in L. B. C. 1864.)

F. ramosa (branched).* *fl.* white, loosely arranged; rachis and sepals glabrous; inflorescence much branched. July, August. *l.* shortly stalked, usually decurrent. *h.* 2ft. to 3ft. 1831. Plant caulescent. (B. M. 3824.)

F. sonchifolia (Sowthistle-leaved).* *fl.* loosely arranged; petals pink, often with a darker blotch near the base. July. *l.* with short petioles, usually decurrent below the auricles to the extreme base. *h.* 2ft. 1830. (B. M. 3309; S. B. F. G. vol. 5, 169.)

FRANCOEÆ. A tribe of *Saxifrageæ.*

FRANGIPANI-PLANT. *See* **Plumiera tricolor.**

FRANGULA. Included under **Rhamnus.**

FRANKENIA (named after John Frankenius, 1590-1661, Professor of Botany at Upsal, who first enumerated the plants of Sweden, in "Speculum Botanicon," 1638). Sea Heath. Including *Beatsonia* and *Hypericopsis*. ORD. *Frankeniaceæ*. Small, prostrate, Heath-like, hardy or half-hardy evergreen plants, with the flowers usually rising from the forks of the branches, or disposed in terminal cymes. Several of the species are pretty subjects for rockwork, or in borders of dry, light, sandy soil. Increased by divisions.

F. capitata Nothria (headed Nothria). *fl.* pale red, terminal, aggregate; petals toothed. June to August. *l.* clustered, linear, glabrous, with revolute margins, ciliated at the base. Stems prostrate, glabrous. Cape of Good Hope, 1816. Hardy.

F. corymbosa (corymbose). A synonym of *F. Webbii*.

F. lævis (smooth).* *fl.* flesh-coloured, rising from the forks of the stem, terminal or axillary, solitary. July. *l.* clustered, linear, glabrous, with revolute margins, ciliated at the base. Stems prostrate, rooting. This native species is one of the prettiest. (Sy. En. B. 190.)

F. pauciflora (few-flowered). *fl.* pink, closely sessile in the last forks, forming a more or less dense terminal leafy cyme, and sometimes unilaterally arranged along its branches. July. *l.* opposite, or the upper ones in whorls of four, oblong-linear, obtuse, or rarely almost acute; margins usually revolute. Branches ascending, dichotomous, erect or divaricate, nearly glabrous, with short down. *h.* 1ft. Australia, 1824. Half-hardy; shrubby, procumbent. SYN. *F. scabra*. (B. M. 2896.)

F. portulacifolia (Purslane-leaved). *fl.* red. *l.* roundish, fleshy, glabrous. Stem shrubby, bushy. *h.* 6in. St. Helena. Half-hardy. SYN. *Beatsonia portulacifolia*.

FIG. 33. FLOWERING BRANCH OF FRANKENIA PULVERULENTA.

F. pulverulenta (powdery).* *fl.* red, solitary; petals sub-repand. July. *l.* roundish-ovate, powdery beneath. *h.* 3in. South Europe. Hardy. See Fig. 33. (S. F. G. 344.)

F. scabra (rough). A synonym of *F. pauciflora*.

F. Webbii (Webb's). *fl.* rose-coloured, in terminal corymbs. June and July. *l.* clustered, linear, with revolute margins, glabrous, somewhat ciliated at the base. Stems velvety, erect. *h.* 6in. South-west Europe, &c., 1823. Hardy. SYN. *F. corymbosa*.

FRANKENIACEÆ. A small order of herbs or sub-shrubs, containing one genus, *Frankenia*. The species number about twelve, and are widely dispersed over the sea-coasts of nearly all the temperate and warmer regions of the globe. They possess no properties of importance.

FRASERA (named after John Fraser, 1750-1811, a collector of North American plants). ORD. *Gentianeæ*. A genus of about seven species of North-west American hardy perennial herbs. Flowers axillary, stalked; corolla wheel-shaped, four-cleft. Leaves opposite or verticillate. They thrive in a moist situation, and may be increased by seeds, or by divisions.

F. carolinensis (Carolina). A synonym of *F. Walteri*.

Frasera—*continued*.

F. Walteri (Walter's). *fl.* yellowish, verticillate, on short, one-flowered pedicels. July. *l.* opposite and sub verticillate, oblong. Stems and branches tetragonal. *h.* 3ft. to 6ft. Carolina, 1795. SYN. *F. carolinensis*.

FRAXINEÆ. A tribe of *Oleaceæ*.

FRAXINELLA. *See* **Dictamnus albus**.

FRAXINUS (the old Latin name of the tree). Ash. Including *Ornus*. ORD. *Oleaceæ*. Large, ornamental, hardy deciduous trees, with lateral racemes of greenish-yellow or whitish flowers, and opposite, unequally pinnate, rarely simple leaves. They flourish in moderately good soil, in sheltered situations. Propagation is effected chiefly by seeds, the varieties being increased by grafting. The seeds of the common Ash ripen in October, and should be gathered and laid in an open pit, constructed in a place where the soil is light and porous. Two bushels of sand should be mixed with each bushel of seed, and the whole put into this pit till the February following, during which time it must be turned over several times, to prevent heating. The seeds should be sown in beds, in good friable soil, a sandy loam being the best for the purpose. After remaining two years in the seed bed, the plants may be removed, and placed, at a distance of 6in. from each other, in rows 1½ft. apart. These should stand two years longer, when they will be fit for permanently planting out during any mild weather in autumn or early spring. Exclusive of the many varieties, the present genus is comprised of about thirty described species. About ten of these are natives of North America.

F. acuminata (taper-pointed). A synonym of *F. americana*.

F. alba (white). A synonym of *F. americana*.

F. americana (American).* White Ash. *fl.* white, disposed in terminal panicles. April and May. Samaras narrow, obtuse, mucronate. *l.* with two to four pairs of ovate or ovate-acuminated, shining, serrated leaflets, 3in. to 5in. long, and 2in. broad. Branches brownish-grey. *h.* 30ft. to 40ft. East United States, 1723. SYNS. *F. acuminata*, *F. alba*, *F. Curtisii*, *F. epiptera*, and *F. juglandifolia* (of Lamark). The variety *latifolia* has broader leaves than the type.

F. angustifolia (narrow-leaved). A synonym of *F. excelsior australis*.

F. argentea (silvery). A synonym of *F. Ornus*.

F. caroliniana (Carolina). A synonym of *F. platycarpa*.

F. concolor (one-coloured). A synonym of *F. viridis*.

F. Curtisii (Curtis's). A synonym of *F. americana*.

F. epiptera (wing-topped). A synonym of *F. americana*.

F. excelsior (taller).* Common Ash. *fl.* greenish-yellow, naked, produced in small crowded axillary panicles. March and April. Samaras linear-oblong, notched at the tip. *l.*, leaflets in five or six pairs, almost sessile, lanceolate-oblong, acuminate, serrated, cuneated at the base. *h.* 30ft. to 80ft. Europe (Britain). (B. M. Pl. 171.) Of the numerous varieties of this fine tree, the following is a pretty extensive and comprehensive list. As a rule, the name indicates the general distinctive character of each sort: *aucubæfolia, aurea, aurea pendula, aurea pendula stricta, coarctata, crispa, heterophylla, heterophylla variegata, horizontalis, oxyacanthifolia, pendula, pendula foliis variegatis, scolopendrifolia, simplicifolia* (= *monophylla*), *simplicifolia laciniata, spectabilis, viridis*, and *Wentworthi pendula*.

F. e. australis (Southern). *fl.* greenish-white, naked. May. Samaras in three or four pairs, 1½in. to 2in. long, lanceolate. *l.*, leaflets sessile, lanceolate, remotely denticulated; peduncles below the leaves, solitary, 2in. long. Branchlets green, dotted with white. *h.* 30ft. to 50ft. South-west Europe and North Africa, 1815. SYN. *F. angustifolia*.

F. floribunda (bundle-flowered). *fl.* white, in compound, thyrsoid, terminal panicles. April. Samaras linear or narrow-spathulate, obtuse, and entire. *l.*, leaflets elliptic-oblong, acuminated, serrated, glabrous, stalked. *h.* 30ft. to 40ft. Nepaul, 1822. SYN. *Ornus floribunda*. (B. F. F. 37.)

F. juglandifolia (Walnut-leaved). A synonym of *F. viridis*.

F. juglandifolia (Walnut-leaved), of Lamark. A synonym of *F. americana*.

F. lentiscifolia (Lentiscus-leaved). A synonym of *F. oxyphylla parvifolia*.

F. longicuspis (long-pointed). *l.* with two or three pairs of lanceolate, very acuminate leaflets. Japan, 1869.

F. Mariesii (Maries'). *fl.* white, in numerous erect strict panicles from the uppermost axils. *l.* 4in. to 6in. long; petiole and rachis

Fraxinus—*continued.*

slender; leaflets five. Northern China, 1880. A small tree. (B. M. 6678.)

F. nigra (black). A synonym of *F. pubescens.*

FIG. 34. FLOWERING BRANCH OF FRAXINUS ORNUS (MANNA ASH).

F. Ornus (Ornus). Manna Ash. *fl.* greenish-white, complete or hermaphrodite; peduncles axillary, shorter than the leaves. May and June. Samaras brown. *l.*, leaflets lanceolate or elliptic, attenuated, serrated, stalked, entire at the base, villous or downy beneath. Young branches purplish or livid, with yellow dots. *h.* 20ft. to 30ft. South Europe, 1730. A very handsome and free-flowering tree. SYNS. *F. argentea, F. rotundifolia,* and *Ornus europæa.* See Fig. 34. (W. D. B. 2, 107.)

F. oxycarpa (sharp-fruited). A synonym of *F. oxyphylla.*

F. oxyphylla (sharp-leaved). *fl.* greenish-yellow, naked. May. Samaras lanceolate, attenuated at both ends, mucronate. *l.* dark glossy green, produced in tufts at the ends of the branches; leaflets two to three pairs, almost sessile, lanceolate, acuminated, serrated. Branchlets green, with white dots. *h.* 30ft. to 40ft. Caucasus, 1815. SYN. *F. oxycarpa.*

F. o. parvifolia (small-leaved). *fl.* greenish-yellow, naked. May, June. Samaras narrow, gradually widening to the apex, and retuse there. *l.*, leaflets four to five pairs, petiolate, oblong and lanceolate, sharply serrated; serratures mucronate. Branches dark purple. *h.* 30ft. to 50ft. Aleppo, 1710. SYN. *F. lentiscifolia.*

F. pallida (pale). A synonym of *F. platycarpa.*

F. pauciflora (few-flowered). A synonym of *F. platycarpa.*

F. pennsylvanica (Pennsylvanian). A synonym of *F. pubescens.*

F. platycarpa (broad-fruited). Carolina Water Ash. *fl.* greenish-yellow. May. Samaras broadly winged, 2in. long, acute at both ends. *l.*, leaflets almost sessile, very distinctly serrated, elliptic-lanceolate, 2in. long, 1in. broad. *h.* 30ft. to 50ft. Eastern United States, 1724. SYNS. *F. caroliniana, F. pallida, F. pauciflora,* and *F. triptera.*

F. potamophila (swamp-loving). *fl.* greenish, in short dense racemes. Samaras stalked, oblong, with a wedge-shaped base. *l.* small. Young branches of a greyish-brown colour, with black buds. Turkestan.

F. pubescens (downy). *fl.* greenish-yellow, calyculate; racemes rather compound. May. Samaras narrow-lanceolate, obtuse, with a short mucro at the apex, 2in. long. *l.*, leaflets three to four pairs, petiolate, elliptic-ovate, serrated, downy or tomentose beneath, as well as the petioles and branches. *h.* 30ft. Eastern United States, 1811. SYNS. *F. nigra, F. pennsylvanica, F. tomentosa.*

F. quadrangulata (four-angled). Blue Ash. *fl.* greenish-yellow. May. Samaras blunt at both ends. *l.* 1ft. to 1½ft. long; leaflets two to four pairs, almost sessile, elliptic-lanceolate, serrated, downy beneath. Branches quadrangular. *h.* 60ft. to 70ft. Eastern United States, 1823.

F. rotundifolia (round-leaved). A synonym of *F. Ornus.*

F. sambucifolia (Elder-leaved). Black Ash. *fl.* like those of the common Ash. May. *l.*, leaflets three pairs, 3in. to 4in. long, acute at both ends, sessile, ovate-lanceolate, serrated. Young branches green, beset with black dots. *h.* 30ft. Eastern United States, 1800.

F. tomentosa (tomentose). A synonym of *F. pubescens.*

F. triptera (three-winged). A synonym of *F. platycarpa.*

F. viridis (green). *l.*, leaflets bright green both sides, or barely pale beneath, from oblong-lanceolate to ovate, mostly acuminate, and sparsely and sharply serrate or denticulate. *h.* 30ft. North America, 1824. SYNS. *F. concolor, F. juglandifolia.* There is a variety, *F. v. Berlandieriana.*

FREE. Not adhering to anything else; not adnate to any other body.

FREESIA (derivation unknown). ORD. *Irideæ.* A genus of a couple of species (in all probability, these are simply forms of one) of very pretty conservatory plants, from the Cape of Good Hope. They may be readily increased from seed, which should be sown as soon as ripe, in pots of light sandy soil, and placed in a sunny position, in a cool frame. When the young plants appear, air should be admitted; but draughts are very injurious, and must be specially avoided. As the seedlings do not succeed well transplanted, it is best to sow in 5in. pots, and thin out to six or eight of the strongest plants, this being about the space required for flowering bulbs. If sown in August, the young plants may flower the following spring, but this is by no means certain. They will, however, form good bulbs for the second year. Freesias intended for flowering should be shaken out of the old soil in August or September, and repotted in sandy loam, leaf mould, and decayed manure. The different sizes should be placed together in separate pots or shallow pans, in order to have plants uniform in strength when flowering. Water will not be required until growth commences, and a frame where frost is excluded will be warm enough. Plenty of air in mild weather, with a light position, is most conducive to a dwarf, sturdy growth. When the flowers appear, a little more heat may be applied to a portion for an earlier supply, others being left to form a succession. Freesias are largely and very successfully grown in Guernsey. They are potted in successive batches throughout the autumn, the first being inserted in August. These begin flowering in December, and the supply is kept up until late in spring. The flowers are very fragrant, and last a long time when cut and placed in water. A number of slightly varying forms have received distinctive names in nurseries.

F. Leichtlinii (Leichtlin's). *fl.* yellow or cream-colour; funnel narrowing abruptly into the tube; throat more open, with the segments spreading less horizontally than in *F. refracta. h.* 1ft. 1875. (R. G. 808.)

F. odorata (sweet-scented). A synonym of *F. refracta.*

F. refracta (bent back). *fl.* pure white, sometimes marked with a few violet lines, and usually with orange patches on the lower segments of the perianth; funnel long, gradually narrowing into the tube below; throat of funnel somewhat narrow; segments spreading horizontally, and with a peculiar fragrance. SYN. *F. odorata.* (B. R. 135.)

F. r. alba (white). *fl.* of the purest white, frequently without the orange-coloured blotches usually present in the type. See Fig. 35.

FREMONTIA (named after Colonel Fremont, an American officer). ORD. *Malvaceæ.* A beautiful hardy deciduous shrub, with coloured calyx, and without petals. It thrives in a sandy loam soil, and does well on a west or north wall, also as a bush in the Southern Counties of England. Increased by cuttings, in spring, placed under a hand glass; or by seeds.

F. californica (Californian).* *fl.* bright yellow, about 2in. across, solitary on short peduncles opposite the leaves. April. *l.* large, cordate, five to seven-lobed, hairy beneath; young shoots covered with a rich brown tomentum. *h.* 6ft. to 10ft. California, 1851. (B. M. 5591.)

FRENCH BEANS. *See* **Beans.**

FRENCH MARIGOLD. *See* **Tagetes patula.**

FRENELA. *See* **Callitris.**

FREYCINETIA (named after Admiral Freycinet, 1779-1842, the French circumnavigator). ORD. *Pandaneæ.* A genus of about thirty species, natives of Eastern tropical Asia, the Malayan Archipelago, tropical Australia, and the Pacific Islands. They are tall-growing evergreen stove climbers, suitable for clothing pillars, &c., which should, however, be bound round with sphagnum or fibrous peat, kept moist, so that the climbing stems may root into it. The soil in which the plants do best, either in pots or when planted out, is a well-drained sandy loam. Increased by offsets.

FIG. 35. FREESIA REFRACTA ALBA.

Freycinetia—*continued.*

F. Banksii (Banks'). *fl.*, spikes cylindrical, 3in. to 4in. long, surrounded by white, fleshy bracts. *fr.* 6in to 8in. long, and 6in. to 8in. in circumference, of a rich brown hue when ripe, edible. New Zealand. (B. M. 6028.)

FIG. 36. FREYCINETIA CUMINGIANA.

F. Cumingiana (Cuming's). This has shorter, ascending or horizontally spreading leaves (not arching, as in *F. Banksii*). It is, moreover, a more slender grower. See Fig. 36.

FREZIERA (named after A. F. Frezier, 1682-1773, a French engineer and traveller in Chili, who published an account of his travels in 1716). SYN. *Eroteum.* ORD. *Ternströmiaceæ.* A genus containing a dozen or more species of evergreen shrubs, with small axillary flowers, natives of tropical America. None are worthy of special mention.

F. theoides (Tea-like). A synonym of *Cleyera theoides.*

FRIESIA (named after Elias Magnus Fries, M.D., 1794-1878, a celebrated cryptogamic botanist). ORD. *Tiliaceæ.* This genus, now included under *Aristotelia*, contains but a single species, a very ornamental greenhouse evergreen shrub, and an excellent plant for growing against the wall of a conservatory. It thrives freely in a mixture of turfy loam and peat. Increased by cuttings, which root readily in sandy soil.

F. peduncularis (peduncled). *fl.* white; pedicels axillary, spreading, one-flowered, somewhat nodding. September. *l.* opposite, lanceolate, serrated. *h.* 3ft. to 6ft. Van Dieman's Land, 1818. (B. M. 4246.)

FRINGE FLOWER. *See* **Schizanthus.**

FRINGE-TREE. *See* **Chionanthus.**

FRITILLARIA (from *fritillus*, a chess-board; referring to the chequered flowers of some species). Fritillary. Including *Rhinopetalum* and *Theresia.* ORD. *Liliaceæ.* A genus comprising upwards of fifty species of hardy, bulbous plants. Flowers drooping, terminal or axillary, campanulate; perianth of six divisions, each with a nectar-bearing hollow at the base on the inside; style three-groved or trifid. Stems leafy. The usual mode of propagation is by offsets that are naturally developed by the plants when left undisturbed. Some of the free-growing species produce many more of these than the small slender ones. Seeds are ripened freely by some species, but not by all of them in this country. If desired, these may be sown when ripe, in pans of sandy soil, and the seedlings allowed to remain for the first year, the young plants being impatient of root disturbance. It takes from four to six years to grow them from seed to a size sufficiently large for flowering. All small offsets should be collected when the old bulbs are being lifted or replanted. If they are placed in lines, a short distance apart, in a piece of prepared ground, flowering specimens may be more quickly obtained. Fritillarias are best suited for positions in the mixed flower border, arranged according to their several heights. They should have a rich, well-drained soil, as anything like stagnant water near the bulbs, especially with the small-growing species, proves destructive. It is not advisable to lift the bulbs oftener than every three or four years, if it can be avoided, and then they should be replanted without delay, and surrounded with some new soil. A dressing of manure, to established plants of Crown Imperials, just after growth commences, is beneficial, as a number of roots proceed from the flower-stem just above the bulb. The latter should be planted at least 4in. to 6in. below the surface, and from 1½ft. to 2ft. apart. Fritil-

FIG. 37. FLOWERING STEMS OF FRITILLARIA AUREA.

Fritillaria—*continued.*

larias may be grown in large pots, if desired, in a cold frame, but must not be subjected to forcing in any way. They are perfectly hardy, and best suited for the open ground, but the young tender growths and flowers are liable to injury by late frosts in spring.

F. acmopetala (sharp-petalled). *fl.* more or less drooping; perianth campanulate; segments more or less flushed with purple on the back and tip, the rest greenish, obovate-oblong, obtuse. Spring. *l.* rather glaucous, all alternate, linear. Stem slender, glaucous, one-flowered. *h.* 1ft. Alps of Asia Minor, 1876.

F. armena (Armenian).* *fl.* soft yellow, nodding, solitary, bell-shaped. *l.* lanceolate, or linear-lanceolate. *h.* 6in. Armenia, 1878. A very pretty species, resembling our native one in time of flowering, &c. (B. M. 6365.)

F. aurea (golden). *fl.*, perianth bright yellow, solitary, cernuous, bell-shaped, 1in. deep, rounded equally from middle to base; divisions with seven to nine rows of small black tesseræ much broader than deep; outer segments oblong, ⅜in. broad; inner ones obovate, ½in. broad. *l.* about ten to a stem; lower ones in whorls of three, linear, glaucescent, fleshy, 2in. to 3in. long; bract leaf solitary. Stem glaucescent, 6in. high. Cilicia, 1876. See Fig. 37. (R. G. 840.)

F. dasyphylla (thick-leaved). *fl.* more or less drooping; perianth broadly funnel-shaped; segments purplish on the back, yellow, without any tessellations inside, with a small green oblong foveole above the base. April. *l.* green, fleshy, all alternate, or the lowest (and sometimes the uppermost) opposite; the lowest oblanceolate-oblong, sub-obtuse; the others lanceolate and linear. Stem one (rarely two) flowered. *h.* 6in. Asia Minor, 1875. (B. M. 6321.)

F. delphinensis (Dauphiné).* *fl.* drooping, inodorous; perianth vinous-purple, spotted yellow, often obscurely tessellated; segments oblong, obtuse; anthers yellow, three lines long. *l.* four to six, all above the middle of the stem, upper ones linear, lower ones oblanceolate. Stem very often one-flowered. *h.* 6in. to 12in. South Europe.

F. d. Burnati (Burnat's). *fl.* solitary, nodding, about 2in. long, bell-shaped; segments of perianth carinate outside in the lower half, lurid brownish-red, close. *l.* linear-lanceolate, slightly glaucous. *h.* 6in. to 8in. 1879.

F. d. Moggridgei (Moggridge's). *fl.* yellow, tessellated inside with brown, solitary, large, cylindrical, bell-shaped. August. *l.* broad. *h.* 1ft. Maritime Alps, 1880. A very handsome variety. (Fl. Ment. 25.)

F. græca (Greek).* *fl.* solitary, rarely two, smaller than those of *F. Meleagris*, and less campanulate; sepals elliptical, slightly apart when fully open, tawny or ferruginous brown, spotted, but scarcely tessellated, with a dorsal green line continued to the projection which constitutes the nectary at the base. March. *l.*, root ones from young bulbs 4in. to 6in. long, lanceolate, tapering into a petiole; cauline ones elliptical or linear-lanceolate, nearly erect, striated. Stem slender, erect, terete. *h.* 6in. Greece. This plant is closely allied to *F. tulipifolia*. (B. M. 5052.)

F. Hookeri (Hooker's).* *fl.* pale lilac, racemose, bell-shaped, about 1in. long. Summer. *l.* about 8in. long. *h.* 6in. Sikkim, 1878. (B. M. 6385.)

FIG. 38. FRITILLARIA IMPERIALIS, showing Habit and detached Single Flower.

F. imperialis (Imperial).* Crown Imperial. *fl.* about the size of ordinary Tulips, varying in colour from yellow to crimson, drooping, disposed in a whorl at the top of the leafy stem, which is surmounted with a tuft of leaves. April. Stem 3ft. or more in height. Persia, 1596. See Fig. 38. (B. M. 194.) The following varieties are enumerated by Mr. T. S. Ware: *Aurora*, very distinct, curious bronzy-crimson flowers; *aurea marginata*, extremely showy, having the leaves margined with a broad, golden-yellow band; *lutea*, cluster of bright yellow flowers; *Minature*, a pretty, dwarf-growing, red-flowered variety; *rubra*, dark red flowers; *rubra maxima*, a fine form, with immense flowers; *Slagzwaard*, a fasciated form, immense deep red flowers; *sulphurine*, large, sulphur-coloured flowers.

F. involucrata (involucrate). *fl.* drooping; perianth vinous-purple, slightly tessellated; divisions oblong. May. *l.* linear-lanceolate, opposite below, forming a whorl of three above. Stems one-flowered. *h.* 1ft. Maritime Alps. (Fl. Ment. 35.)

F. kamtschatcensis (Kamtschatkan). *fl.*, perianth livid vinous-purple, not tessellated, campanulate, 1in. to 1½in. long, the segments oblong-oblanceolate, obtuse; pedicels drooping, ½in. to 1in. long. Spring. *l.* ten to fifteen above the middle of the stem; lower ones in whorls, lanceolate, 2in. to 4in. long. Stem 6in. to 18in. high. Eastern Siberia, &c. SYN. *Lilium camtschatcense*. (R. G. 173.)

F. Karelini (Karelin's). *fl.* pale purple, spotted, bell-shaped, racemose. *h.* 6in. Central Siberia to Beloochistan, 1834. SYN. *Rhinopetalum Karelini*. (B. M. 6406.)

F. lanceolata (lanceolate-leaved). *fl.* dull vinous-purple. *l.* lanceolate, whorled. *h.* 1ft. to 1½ft. North-west America, 1872. (H. F. B. A. ii. 193.)

F. lutea (yellow).* *fl.* drooping; perianth yellow, more or less suffused with purple; segments oblong-lanceolate, five to eight lines broad. April and May. *l.* linear-lanceolate, alternate; the upper approximated, shorter than the terminal solitary flower. Stem very often one-flowered. *h.* 6in. to 1ft. Caucasus, 1812. (B. M. 1538.)

F. l. latifolia (broad-leaved). *fl.* vinous-purple, greenish, or tessellated with yellow. April and May. *l.* lanceolate, approximated; the upper opposite, as long as the terminal solitary flower. Caucasus, 1604. (B. M. 853, 1207.)

F. macrandra (large-anthered). *fl.*, perianth purple, with a glaucous tinge on the outside, yellow with green lines quite untessellated on the face, funnel-shaped; anthers two and a-half lines long, oblong, with a very distinct cusp. May. *l.* five or six, scattered, green, fleshy, ascending; lower ones oblong-lanceolate, 3in. to 4in. long; upper ones linear, under ½in. long. Island of Syra, 1875.

F. macrophylla (large-leaved).* *fl.* rose, racemose, horizontal, campanulate; perianth segments obovate-lanceolate, with a darker mass at base; stamens declinate. April to June. *l.* alternate, linear, acuminate, soft. *h.* 3ft. Mussooree, 1843. (B. M. 4725, under name of *Lilium roseum*; B. R. xxxi. 1, under name of *Lilium Thomsianum*.)

FIG. 39. FRITILLARIA MELEAGRIS, showing Habit and detached Single Flower.

F. Meleagris (Guinea-fowl-like).* Common Fritillary; Snake's Head. *fl.* chequered with pale and dark purple, terminal, pendulous, solitary; points of perianth turned inward. April. *l.* alternate, narrow-lanceolate. *h.* 1ft. Europe (Britain, especially in Oxfordshire) to Caucasus. See Fig. 39. (Sy. En. B. 1519.) There are white and double-flowered forms of this species.

F. meleagroides (Guinea-fowl-like). *fl.* dark purple. April. *h.* 6in. Altai Mountains, 1830. (B. M. 3280, under name of *F. minor*.)

F. montana (mountain). A synonym of *F. tenella*.

F. obliqua (oblique). *fl.* brown, purple; corolla turbinate. April. *l.* glaucous, numerous, oblique. *h.* 1ft. Caucasus. (B. M. 857.)

F. oxypetala (sharp-petalled). *See* **Lilium oxypetalum.**

F. pallidiflora (pale-flowered).* *fl.* yellow, beautifully chequered in the interior. *l.* large, glaucous-blue. *h.* 9in. Siberia, 1880. Very distinct. See Fig. 40. (R. G. 209.)

F. persica (Persian).* *fl.* deep violet-blue, rather small, bell-shaped, slightly scented. *h.* 3ft. Persia, 1596. Very distinct and curious. (B. M. 1537.)

F. p. minor (smaller). A smaller-flowered form, with the stamens slightly longer than the perianth. (B. M. 962.)

F. pudica (chaste).* *fl.* dark yellow, more than 1in. across, bell-shaped, usually solitary, sometimes twin. May. *l.* alternate, linear, glaucous. Stem upright, leafy. *h.* 6in. to 9in. North-west America. See Fig. 41.

Fritillaria—*continued.*

F. p. lutescens (yellowish) has a yellowish-green stripe on the outer segments of the perianth.

F. p. nigra (black) is a garden form, with leaves ½in. to ¾in. wide, and three or four dark-coloured flowers.

F. pyrenaica (Pyrenese).* *fl.* deep purple, large. June. *h.* 1½ft. Mountains of Southern France and Northern Spain, 1605. (B. M. 664.)

FIG. 40. FLOWERING STEM OF FRITILLARIA PALLIDIFLORA.

F. recurva (recurved).* *fl.* bright scarlet; perianth segments recurved. May. Stems one to nine-flowered. *h.* 2ft. California, 1870. A very distinct and beautiful species, with flowers nearly as large as those of *F. Meleagris.* See Fig. 42. (B. M. 6264.)

F. ruthenica (Russian). *fl.* brown and yellow. May. *l.* linear-lanceolate. *h.* 1ft. Caucasus, 1826. (S. B. F. G. ser. ii. 243.)

F. Sewerzowi (Sewerzow's). *fl.* drooping, forming a loose raceme; perianth lurid purple, with a glaucous tint outside, greenish-yellow within, not at all tessellated, funnel-shaped; segments sub-equal, oblanceolate-oblong, sub-acute, with a raised keel outside down the lower half, which is more strongly marked in the outer three, and a yellow-green linear nectary at the top of the claw inside. *l.* five or six below the inflorescence, all except the lowest opposite or sub-opposite, sessile, oblong, obtuse, rather glaucous when young. Stem long, glaucous, terete. *h.* 1½ft. Turkestan, 1873. A very curious plant. (B. M. 6371.) SYN. *Korolkowia Sewerzowi* (R. G. 760).

FIG. 41. FRITILLARIA PUDICA.

F. tenella (tender).* *fl.* yellowish, densely chequered with purple-brown; perianth divisions oblong-elliptic, rounded at apex, the nectariferous division at base narrow-oblong. April. *l.* distant from one another, nearly straight, linear-oblong; the uppermost two or three forming a whorl, rather distant from the flower; the lowest pair opposite or nearly so, the intermediate ones alternate. Stem stiff, nearly straight. Maritime Alps, 1867. SYN. *F. montana* (under which name it is figured in Fl. Ment. 66). There is a variety *racemosa* (figured in B. M. 952).

F. tulipifolia (Tulip-leaved).* *fl.* glaucous blue, solitary, variable in size, nodding, tulip-shaped; perianth segments sub-equal,

Fritillaria—*continued.*

oblong, obtuse, or obtusely apiculate, rusty brown-purple within, not tessellated; the outer dark glaucous blue, streaked with the

FIG. 42. FRITILLARIA RECURVA.

same purple outside; the inner with a broad glaucous blue band down the back. March. *l.* elliptic, or elliptic-lanceolate, sub-acute, concave, sessile, straight; sheath very short, nerveless,

FIG. 43. FLOWERING STEM OF FRITILLARIA VERTICILLATA THUNBERGII.

Fritillaria—*continued.*

pale green; upper linear-lanceolate. Stem slender, leafless below, but there clothed with appressed sheaths. Caucasus, &c., 1872. An elegant little plant, remarkable for the peculiar colour of its flowers. (B. M. 5969.)

F. verticillata (verticillate). *fl.* white, at the base externally green, and within at the base sprinkled with small purplish spots; solitary, axillary, or terminal, nodding; segments tipped with a green, callous, slightly pubescent apex. May. *l.* bright green, or slightly glaucous, somewhat crowded about the middle of the stem; the lowest pair opposite, many-nerved, without a conspicuous middle rib, ovate, tapering towards the apex, which is rather blunt. Stem simple. Altaic Mountains, 1830. (B. M. 3083, under name of *F. leucantha.*)

F. v. Thunbergii (Thunberg's).* *fl.* greenish, mottled with pale purple, small, solitary, bell-shaped. *l.* long, narrow, linear, terminating in a tendril. China and Japan, 1880. See Fig. 43.

F. Walujewi (Walujew's). *fl.* lead-coloured outside, within purple-brown, with whitish spots, large, solitary. *l.* linear, attenuated into a tendril; those at the middle of the stem verticillate. *h.* 1ft. Central Asia, 1879. (R. G. 993.)

FRITILLARY. *See* **Fritillaria.**

FRŒLICHIA (named in honour of Jos. Al. Froelich, a German physician and botanist, 1796-1841). ORD. *Amarantaceæ.* A genus containing about ten species of annual or perennial herbs, found in the warmer parts of the New World, from Texas to South Brazil. Flowers hermaphrodite, bracteate; spikes sessile or stalked. Leaves opposite, sessile (radical stalked), ovate, linear-oblong or spathulate. They thrive in sandy loam and leaf mould. Propagated by seeds sown in heat, in spring.

F. floridana (Florida). *fl.* white, tomentose or woolly, in ovate or oblong spikes. *l.* varying from linear to oblong; bracts mostly blackish, shorter than the woolly calyx. Stem, erect, simple or branched. *h.* 6in. to 3ft. Southern United States. (B. M. 2603, under name of *Oplotheca floridana.*)

FROG HOPPER, FROG SPIT, or **CUCKOO SPIT** (*Aphrophora spumaria*). The insects secreting "Frog Spit," which often so disfigures plants, are commonly known as Frog Hoppers. They belong to the same order as the *Aphidæ*, but to that section which has the whole of the upper wings leathery. There are two simple eyes or "ocelli," in addition to the two compound ones common to insects in general. It is the larvæ of the

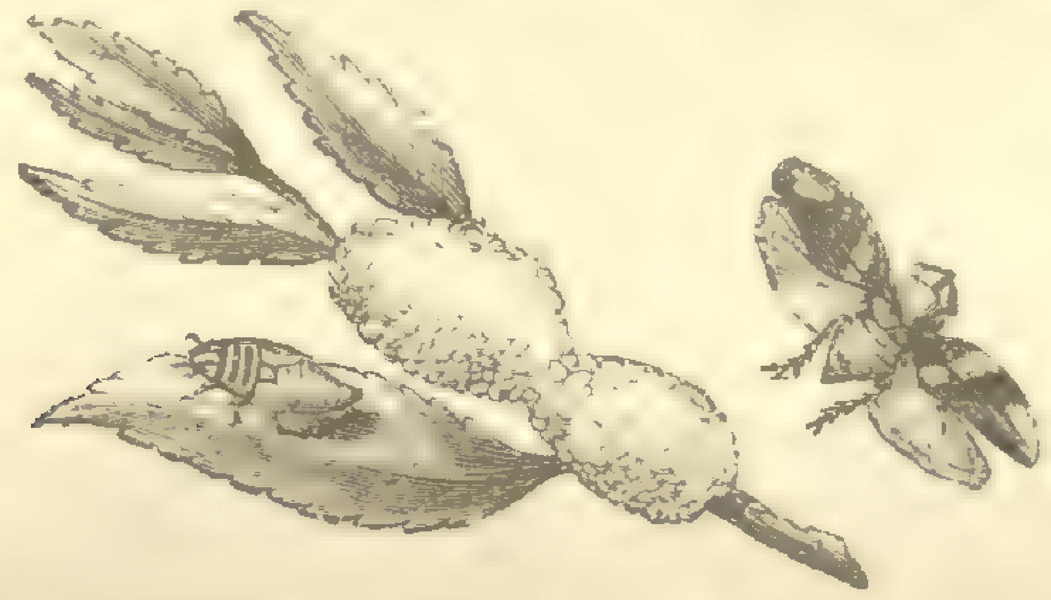


FIG. 44. FROG HOPPER (APHROPHORA SPUMARIA), showing Larva, Frothy Secretion, and Perfect Insect.

"hoppers" that produce Cuckoo Spit (see Fig. 44). The former are plentiful in spring, while the perfect insects abound most in the autumn. When the curious-looking larvæ are deprived of the shelter afforded by this sugary secretion, they appear at first quite helpless, and, if the day be hot, are almost immediately killed. Hence an effectual mode of clearing plants of Cuckoo Spit, is to brush it off during sunshine, and the insects are at the same time destroyed. This pest attacks the young shoots of plants, choosing the axil of a leaf for its abode, and so damaging the shoot in some cases as to cause it to die or become malformed. Carnations, Pinks, and similar plants suffer greatly from its ravages. The following remedies, together with a frequent syringing with clear water, will be found effective:

Tobacco Liquid. To a gallon of water add 1oz. of soft soap, and, when thoroughly dissolved, mix a tablespoonful of Corry and Soper's Nicotine, well syringing the plants. This is best applied lukewarm, and then well washed off with clean water in about an hour.

Quassia. Steep ¼lb. quassia chips in a gallon of boiling water, and, when cold, add about the same quantity

Frog Hopper, &c.—*continued.*

of water. This should be applied with a syringe, and not washed off afterwards. It renders the stems of the plants nauseous, but does not injure them. Bitter aloes may also be used in a similar way.

FRONDS. The leaves of palms and ferns are improperly called Fronds. A true Frond is a combination of leaf and stem, as in many seaweeds and liverworts.

FROST. The presence of Frost denotes a fall of temperature to a point at which still water becomes solidified; and its intensity is known by the contraction of another liquid used in the construction of the thermometer, which does not become frozen at any temperature experienced in this country. Fahrenheit's scale is that in use for thermometers in Great Britain, and this places freezing point at 32deg., and boiling water at 212deg., the intervening space being divided equally into 180 parts, termed degrees. Similar divisions are made below freezing point, and the fall of the liquid in use, which is either Mercury or Spirits of Wine, below this indicates, in so many degrees, the amount of Frost. On plants or other subjects unprotected, the action of Frost is from the top downwards towards the earth; hence the value of, and safety frequently effected by, slight coverings that are non-conductors of heat, and consequently prevent its loss by radiation. The effect of Frost on plant life is not always in proportion to its intensity or the hardiness of the plant under what may be termed natural conditions. A spell of mild weather frequently places vegetation in a growing and tender state, especially in spring, when a sudden change to a few degrees of Frost may cause more destruction than a great deal at another time, when vegetation was more dormant. Frost acts most injuriously on anything wet, and is least destructive under the reverse condition. It is most successfully removed from plants too tender to withstand it, by adopting a method as gradual in effect as possible. Frost penetrates in a slow and natural way, and the greatest injury, if any, is caused when it is suddenly displaced by heat, either from sunshine or artificially. Syringing is sometimes recommended with tender subjects that have become frozen, but it should be remembered that water which is itself much above the freezing point, will, when applied, cause a sudden change to anything that is considerably below. Frost has a most beneficial effect on all soils exposed to its influence, by penetrating and pulverizing them, so that what was before unworkable and useless, is afterwards rendered fertile and amenable to the successful cultivation of various crops.

FRUCTIFICATION. All those parts composing the fruit of plants.

FRUIT. That portion of a plant which consists of the ripened carpels, and the parts adhering to them.

FRUIT BORDERS. *See* **Borders, Fruit.**

FRUIT GARDEN. *See* **Garden.**

FRUIT-GATHERING. This cannot be too carefully performed to avoid bruising, especially with those fruits having a tender skin. Dry weather should be selected at all times for the operation outside, and only such gathered as are at the proper stage. It sometimes becomes necessary, at the expense, however, of quality, to select Peaches and similar fruits several days before they are fully matured, to admit of packing and transmitting them to a distance. It is important, in gathering these, that the necessary pressure be equally applied by the whole of the fingers, and the fruits carefully placed bottom downwards on some soft material, in a shallow tray or basket. Nothing is more quickly bruised, or shows its consequent effect by decay, than thin-skinned ripe fruits. Those grown under glass are even more susceptible to injury in this way than hardier ones from outside. The keeping properties of Apples, Pears, and similar fruits,

Fruit-gathering—*continued.*

depend a great deal on careful gathering at the proper time, and subsequent storing; an indication of the time is generally known by some of the fruit falling off, and by the condition of the pips. Fruit-gathering is always best performed by two persons, one to carry a proper basket, and the other to collect and place the fruit in it.

FRUIT PROTECTORS. In the northern and other parts of the country, where Apricots, Peaches, &c., do not succeed in the open air, on account of the annual destruction of the flowers by frost, an erection of a

FIG. 45. WALL-FRUIT PLANT PROTECTOR.

glass Protector above them (see Fig. 45, *a*) may frequently be found of great value. The framework should be fixed on stout brackets, and glazed on a system that admits of the glass being removed in summer to allow rain and plenty of air to get to the trees. Netting, frigidomo, or other coverings, may be suspended from the front of the glass Protecto , in the direction shown by the dotted line. A portable Plant and Fruit Protector (see

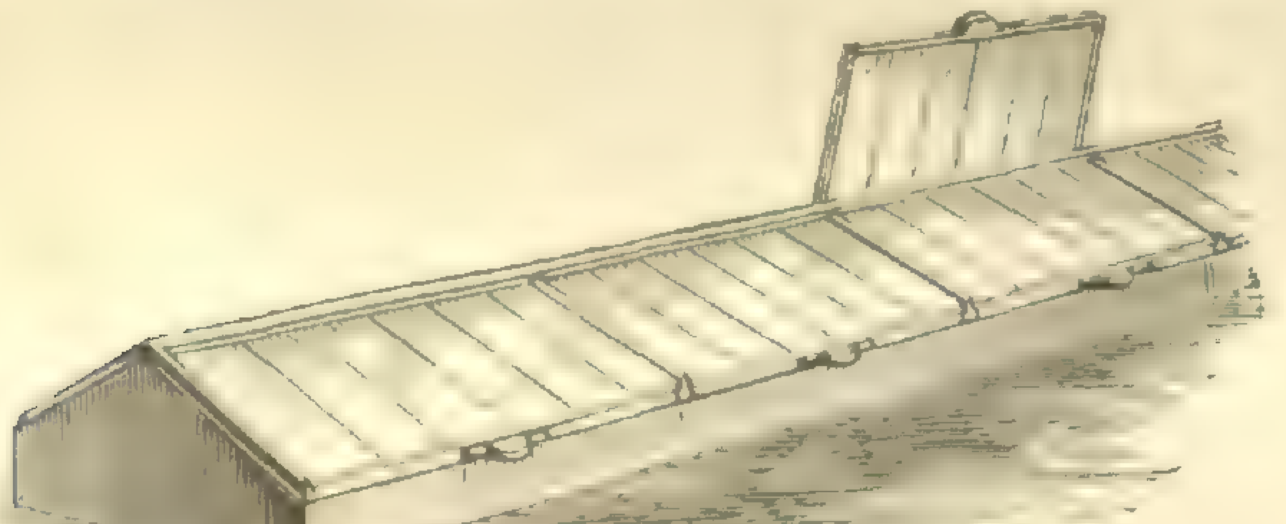


FIG. 46. PORTABLE PLANT AND FRUIT PROTECTOR.

Fig. 46) is usually a very useful structure for growing any dwarf subjects in summer, and for storing plants, such as Strawberries, in winter.

FRUIT-ROOM. A structure specially set apart in gardens for the storing and preservation of fruit. It should have a dry, airy position, and one affected as little as possible by fluctuations of temperature. Means to prevent the occurrence of these internally are introduced into the best-constructed Fruit-rooms by building with hollow walls, or by placing wood partitions round and above the shelves inside, and allowing a channel between them and the wall or roof for a free passage of air. The Fruit-room has usually a central walk and tiers of shelves on either side. The bottom of the latter should be of lattice-work, so as to allow plenty of air amongst the fruit. It is best to have heat at command, either by a small flue or stove, or, better still, by hot-water pipes, with means of applying or stopping it as desired. It is not advisable to give more heat than is sufficient to preserve a dry atmosphere and maintain a steady cool temperature. Fruit, when kept too warm, invariably shrivels, and, if

Fruit-room—*continued.*

allowed to become very cold, any change to warmer air causes a condensation of moisture over the surface that is most injurious. It is considered to keep and retain a better flavour when in a dark place, and, to this end, movable shutters or blinds may be used for excluding light at the windows. All fruit should be stored in a dry state, and constantly examined during winter for the removal of any part showing signs of decay, as a single specimen allowed to become rotten will speedily affect all others with which it comes in contact. A small ventilator in the roof, provided with means for closing in severe frost or in very changeable weather, will be sufficient to cause a change of air and allow the exhalations from the fruit to escape.

FRUTESCENT, FRUTICOSE. Shrubby.

FRUTICULOSE. Of very dwarf shrubby habit.

FUCHSIA (named after Leonard Füchs, 1501-1566, a German botanist). ORD. *Onagraceæ.* A genus comprising about fifty species of small shrubs or trees, natives, with comparatively few exceptions, of Central and Southern America, most of them having been introduced from Chili, Mexico, and Peru. Flowers usually drooping, on axillary one-flowered pedicels, which are sometimes disposed in racemes or panicles at the tops of the branches. Leaves generally opposite. The Fuchsia ranks as one of the most ornamental and popular of garden plants. The first plant is stated to have been brought to this country by a sailor, about the end of the last century. It was observed growing in his window by Mr. James Lee, a nurseryman, of the firm still existing under the name of Lee and Son, at Hammersmith, and, appearing to be a promising plant of an unknown kind, he succeeded, after some little trouble, in purchasing it. A stock was soon obtained, and the next year a large number of plants were distributed. The first representative of the genus had been discovered something like a century previous to this, but none had been introduced to this country. A few species arrived in succession up to about 1840, when the raising of varieties by seed seems to have commenced with that collected from species with long flowers, then recently received. From selection and careful fertilisation of the different flowers afterwards obtained, the numerous varieties now grown have descended. Until about thirty years ago, these only included flowers with a red tube and sepals, and a blue or purple corolla, or those with creamy-white sepals and rose or pink corollas. Then a variety was raised having a white corolla, and subsequently double flowers, in various colours, appeared. These all combined have produced the numerous varied selections of the present day. Several of the old species are still largely grown, the profusion in which the flowers are produced fully compensating for their small size individually. Many are amongst the most beautiful of hardy or half-hardy plants for outside borders, while others of a more tender constitution are distinct and interesting subjects for culture inside. *F. macrostema globosa*, *F. m. gracilis*, and *F. m. Riccartoni* are representatives of the former class; and *F. boliviana*, *F. corymbiflora*, *F. fulgens*, *F. microphylla*, *F. procumbens*, and *F. splendens*, of the latter description. The use of the floriferous varieties for decorative purposes is well known, their graceful and usually compact habit rendering them general favourites. Whether plants be required of a large size for exhibition, or others of smaller proportions for greenhouse or window decoration, centres of vases, and outside flower borders in summer, the Fuchsia is equally well adapted for one and all. Nothing is more attractive than these, in summer and autumn, in a greenhouse, if trained to the rafters or pillars, and their branches allowed to grow and droop naturally with the weight of the flowers.

Propagation is effected by seeds for the raising of new varieties, and by cuttings for the perpetuation of those

Fuchsia—*continued.*

already obtained, or for any of the species. Seeds ripen freely in summer on the majority of plants, if they are required. When ripe, they should be washed from the pulp surrounding them, and afterwards dried, being then either sown at once or kept until early the following spring.

Cultivation. Cuttings of Fuchsias, obtained from the points of young growing shoots that are free from flowers, root readily at any season. The best are those produced by old plants when started in early spring, and these may be grown very rapidly the following summer. If extra-sized specimens are desired, some cuttings should be inserted in autumn, and the young plants kept growing all the winter. These will then be established in pots by the time the others are put in, and will, consequently, be considerably advanced. It is not impossible, under favourable conditions and proper treatment, to insert Fuchsia cuttings in October, and grow pyramidal plants some 6ft. high to flower the following July. This is not the plan usually adopted, old-established plants, under good cultivation, being available for use several years in succession, and are, as a rule, easier to manage and more certain to succeed. The general treatment in the early stages is similar at any season. The cuttings should be placed in light soil, about six in a 3in. pot, and plunged in a warm propagating frame. When rooted, they should be potted singly and kept in a light position, to induce a short-jointed sturdy growth. A temperature of about 60deg., with a rise by sun heat, is one most suitable for the young plants in spring, and plenty of water should be applied, with a syringing in the morning and afternoon. Apart from inducing growth, this tends greatly to keep down insects. Many of the best-habited varieties will require but little stopping or training beyond placing a stick to the leading growth, and looping the others to it. Before the roots become much restricted for room, they should be placed in 5in. or 6in. pots, in which any of the plants will flower if so desired, or they may then be transferred to pots of almost any ordinary size. Fuchsias will succeed if proper attention be bestowed, in almost any soil; but where there is a choice, two parts loam to one of dried cow-dung, or any other good manure, should be selected, well mixed, and used in a lumpy state. Plenty of air and a slight shade are necessary for those grown under glass in summer, particularly when flowering. Liquid manure may be used with advantage so soon as the pots are filled with roots. Stock plants, or any required for growing another year, may be ripened outside, and stored at the approach of frost in any cool dry place. These should not be repotted until new growth has commenced. Tender varieties grown in the open air should be at least one year old when planted, and they may be lifted and treated in a similar way. The hardy ones are more safe if covered with a mound of ashes after being cut down for the winter. Those cultivated on rafters or pillars in a greenhouse should be planted out and allowed to grow at will, except a little thinning of the growths occasionally; they may be kept dry at the root in winter and pruned back to a couple of eyes at the base of each shoot.

F. alpestris (mountain). *fl.* pale crimson; petals broadly cuneate, obtuse, deep purple. August. *l.* opposite, never ternate, oblong-lanceolate, acuminate, their margins slightly revolute and distantly sub-dentate, pubescent above and below. Branches round, densely pubescent. *h.* 20ft. Organ Mountains, 1842. In its native habitat, this plant has a rambling, sub-scandent habit, the branches being from 12ft. to 18ft. or 20ft. high. (B. M. 3999.)

F. apetala (apetalous).* *fl.* drooping, 1½in. long; calyx red; lobes pale yellow; pedicels sub-corymbose, shorter than the flowers. *l.* alternate, petiolate, ovate, acuminated, quite entire. *h.* 1ft. to 2ft. Peru. See Fig. 47.

F. arborescens (tree-like). *fl.* rose-coloured, as are also the rachides and pedicels, numerous, in copiously branched terminal panicles. October to February. *l.* elliptic, attenuated at both ends. Mexico, &c. Small tree or tall shrub. (B. M. 2620.) SYNS. *F. paniculata* and *F. syringæflora* (R. H. 1873, 311).

Fuchsia—*continued.*

F. bacillaris (rod-branched). *fl.* on slender drooping pedicels, springing from the copious upper and younger branchlets, and thus forming a rather large leafy thyrse, or compact panicle; petals deep rose, sub-obcordate, spreading, nerved, bearing a blunt mucro at the retuse apex. Summer. *l.* opposite or ternate, lanceolate or ovate-lanceolate, entire or denticulo-serrate, small, nearly sessile, penninerved. Branches with reddish bark. Mexico. A low-growing shrub. (B. M. 4506.)

FIG. 47. FLOWERING BRANCH OF FUCHSIA APETALA.

F. boliviana (Bolivian).* *fl.* rich crimson, 2in. to 3in. long, tube trumpet-shaped. *h.* 2ft. to 4ft. Bolivia, 1876. Of a compact branching habit, and free growth. (R. H. 1876, 150.)

F. coccinea (scarlet). *fl.*, petals violet, obovate and convolute; sepals scarlet, purple at the base, oblong, acute. Summer. *l.* small, ovate, obtuse, denticulated, on short hairy petioles, downy white underneath, nearly glabrous above. *h.* 3ft. Brazil (?). A very pretty bushy plant, with slender downy branches. (B. M. 5740.)

F. corallina (coral-red).* *fl.* pendulous; corolla dark plum-colour; sepals crimson. *l.* of greenish-crimson tint, the under side being of a dark crimson, opposite, in whorls of four or five. Young stems dark red; old ones attaining a considerable height (20ft. in favourable spots in West of England) and thickness. (G. C. n. s., xx. 565, under name of *F. exoniensis.*)

FIG. 48. FLOWERING BRANCH OF FUCHSIA CORYMBIFLORA.

Fuchsia—*continued.*

F. cordifolia (heart-leaved). *fl.* scarlet, green; pedicels axillary, solitary, one-flowered; calyx downy; tube longer than ovate petals. August and September. *l.* opposite or ternate, cordate, acuminate, denticulate, nearly glabrous. *h.* 5ft. Mexico, 1840. (B. R. 1841, 70.)

F. corymbiflora (cluster-flowered).* *fl.* scarlet, nearly 2in. long, in long terminal clusters; petals oblong-lanceolate, bifid; sepals lanceolate, acute. Summer. *l.* large, opposite, oblong-lanceolate, almost entire, with a rosy midrib. Branches somewhat tetragonal, reddish and downy when young. *h.* 4ft. to 6ft. Peru, 1840. See Fig. 48. (B. M. 4000.)

FIG. 49. FLOWERING BRANCH OF FUCHSIA FULGENS.

F. cylindracea (cylindrical-flowered). *fl.* scarlet. August. *h.* 2ft. Demerara, 1837. (B. R. 66.)

F. decussata (decussate). A synonym of *F. macrostema gracilis.*

F. dependens (drooping).* *fl.*, tube soft scarlet; corolla deeper in colour, in terminal leafy pendulous racemes. Summer. *l.* whorled, ovate-acute, toothed, slightly pubescent above, paler and more decidedly hairy beneath. Chili. *h.* 2ft. to 4ft.

FIG. 50. FLOWERING BRANCH OF FUCHSIA MACROSTEMA GLOBOSA.

Fuchsia—*continued.*

F. Dominiana (Dominy's). A garden hybrid, raised by Messrs. Veitch in 1852, between *F. serratifolia* and *F. spectabilis.* (F. d. S. 1004.)

F. fulgens (glowing).* *fl.* scarlet, 2in. long; petals acutish, shorter than the ovate-lanceolate acute sepals; racemes drooping at the apex. Summer. *l.* opposite, large, ovate-cordate, acute, denticulated, glabrous. *h.* 4ft. to 6ft. Mexico, 1830. See Fig. 49. (B. M. 3801.)

FIG. 51. FUCHSIA MACROSTEMA GRACILIS, showing Habit, and detached Single Flower and Leaf.

F. macrantha (long-flowered). *fl.* rosy, green, apetalous; pedicels axillary, solitary; tube of calyx long. April to June. *l.* ovate-acute, entire. *h.* 3ft. Columbia, 1844. Plant downy. (B. M. 4233.

FIG. 52. FLOWERING BRANCH OF FUCHSIA MACROSTEMA PUMILA.

Fuchsia—*continued.*

F. macrostema (large-stamened).* *fl.*, calyx scarlet; lobes of calyx oblong, acute, exceeding the obovate spreading petals; pedicels axillary, nodding, longer than the flowers. July to October. *l.* three in a whorl, ovate, acute, denticulated, on short petioles. Branches glabrous. *h.* 6ft. to 12ft. Chili, 1823. SYN. *F. magellanica.*

F. m. conica (conical). *fl.* pendulous, solitary; petals purple, about equal in length to the scarlet sepals; tube of corolla conical. June to October. *l.* three or four in a whorl, ovate, flat, denticulated, glabrous; petioles pubescent. *h.* 3ft. to 6ft. Chili, 1824. (B. R. 1062.)

F. m. globosa (globose).* *fl.* globular; petals purplish-violet; sepals purplish-red. Summer. *l.* ovate, acute, small, denticulated. *h.* 5ft. to 6ft. Chili. See Fig. 50. (B. M. 3364.) A seedling from this (*F. riccartoni*), one of the most handsome and the hardiest of all the outdoor Fuchsias, was raised at Riccarton, near Edinburgh, about 1830; it stands the winters, in many parts of Scotland, uninjured.

F. m. gracilis (slender).* *fl.*, petals purple, convolute and retuse; sepals scarlet, oblong, acute, exceeding the petals; pedicels axillary, nodding, puberulous. Summer, autumn. *l.* opposite, glabrous, on long petioles, remotely denticulated. Branches finely pubescent. *h.* 6ft. to 10ft. Mexico, 1823. See Fig. 51. (B. R. 847; B. M. 2507, under name of *F. decussata.*) There is a beautiful variegated form of this species.

F. m. pumila (dwarf). A variety with flowers much like *gracilis*, but of dwarfer habit. See Fig. 52.

F. magellanica (Magellan). A synonym of *F. macrostema.*

FIG. 53. FLOWERING BRANCH AND SINGLE FLOWER OF FUCHSIA MICROPHYLLA.

F. microphylla (small-leaved).* *fl.*, petals deep red, retuse, toothed; calyx scarlet, funnel-shaped, with ovate-acuminate lobes; pedicels axillary. Autumn. *l.* opposite, small, elliptic-oblong, acutish, toothed, glabrous. Branches pubescent. *h.* 2ft. Mexico, &c., 1828. See Fig. 53. (B. R. 1269.)

F. paniculata (panicled). A synonym of *F. arborescens.*

F. penduliflora (pendent-flowered).* *fl.* in axillary and terminal clusters; tube rich crimson, shaded with maroon, 3in. to 4in. long, trumpet-shaped. March. *l.* 3in. to 4in. long, ovate, acuminate, glabrous. Tropical America, 1879. (F. M. n. s. 412.)

F. procumbens (procumbent).* *fl.* small, erect; tube yellowish, upper portion reflexed, blue. *l.* small, round. New Zealand, 1874. This exceedingly pretty little hardy creeper is principally grown on account of its large, oval, magenta-crimson berries, which remain on for months, and are very attractive during the winter. It is an admirable plant for a suspending basket. (B. M. 6139.)

F. serratifolia (saw-edge-leaved). *fl.*, petals scarlet, ovate-oblong; sepals red, rather villous, 1½in. long, exceeding the petals, somewhat tumid at the base; pedicels axillary, drooping. Summer. *l.* in whorls of three or four, narrow, oblong, acute, glandularly toothed. Branches furrowed, reddish. *h.* 6ft. to 8ft. Peru, 1844. See Fig. 54. (B. M. 4174.)

F. sessilifolia (sessile-leaved). *fl.* panicled; petals red; sepals pink and green. June. *l.* oblong-lanceolate, opposite or whorled, with terminal, pendulous, leafy racemes. Columbia, 1865. A pretty shrub. (B. M. 5907.)

F. simplicicaulis (slightly-branched).* *fl.* rose-scarlet, one in the axil of each bract, pendent, numerous, handsome; petals ovate, acute, shorter than the sepals. October. *l.* ternate on the main stem and branches, 4in. to 5in. long, much smaller upon the pendulous, elongated, flowering branches; ovate, approaching to lanceolate, a little polished above, entire, on very short petioles; those of the bracts sessile. Peru, 1858. A very beautiful plant. (B. M. 5096.)

Fuchsia—*continued.*

F. spectabilis (showy). *fl.*, peduncles red, axillary, solitary, single-flowered, shorter than the leaves; calyx bright red, tube swollen at the base; petals deep red, large, nearly orbicular, waved, very patent, and pressed, as it were, upon the segments of the calyx. September. *l.* mostly ternate, 6in. to 8in. long, between ovate and elliptical, petiolate, not tapering at the base, acute or slightly acuminate at the points, obscurely ciliated, entire at the margin, or only having minute tooth-like processes, occasioned by the presence of small oblong glands; petiole erect or spreading; stipules triangular between the petioles. *h.* 2ft. to 4ft. Andes of Cuenca. A moderate-sized handsome shrub. (B. M. 4375.)

FIG. 54. FLOWERING BRANCH OF FUCHSIA SERRATIFOLIA.

F. splendens (splendid).* *fl.* scarlet and green, very showy. Early summer. *l.* ovate-cordate, pale green. *h.* 6ft. Mexico, 1841. This is one of the best and most distinct of the greenhouse species. (B. M. 4082.)

F. syringæflora (Syringa-flowered). A synonym of *F. arborescens.*

F. thymifolia (Thyme-leaved).* *fl.* red; petals obovate-oblong, undulated; calyx funnel-shaped, with oblong-acute lobes; pedicels axillary. Summer. *l.* about opposite, small, ovate or roundish-ovate, obtuse, nearly entire, downy above, nearly smooth beneath. *h.* 4ft. to 6ft. Mexico, 1827. (B. R. 1284.)

F. triphylla (three-leaved).* *fl.* glowing cinnabar-red, about 1½in. long, in terminal, nodding racemes; petals shorter than the sepals. *l.* small, 1½in. to 3in. long, purplish beneath, and traversed by numerous lateral veins that curve round and run into each other near the margin. *h.* 1ft. to 2ft. West Indies. A handsome ornamental plant. (B. M. 6795.)

F. venusta (charming). *fl.*, petals scarlet, oblong-lanceolate, acute, with undulated margins; sepals purple, about the same shape and length as petals; pedicels axillary; upper ones racemose. August. *l.* opposite, and three in a whorl, elliptic, acute, entire, glabrous. Branches downy. *h.* 4ft. Central America, 1825. (F. d. S. 538.)

VARIETIES. These are very numerous, and are annually increased by others, representing a difference either in form, size, or colour. Many of the old varieties can scarcely be excelled in their general floriferous habit; but those more recently raised have a remarkable variation in shape and length of flowers. The subjoined list includes a selection of the best for general cultivation.

Varieties with Single Flowers. ALBA COCCINEA, tube cherry-coloured, sepals white, corolla rose, very distinct; AURORA SUPERBA, rich salmon, corolla scarlet; BEAUTY OF CLYFFE HALL, tube and sepals blush-white, corolla rich carmine-pink, large and free; BEAUTY OF SWANLEY, tube and sepals white, corolla pink; BEAUTY OF TROWBRIDGE, tube and sepals white, corolla light, good; BLAND'S NEW STRIPED, tube and sepals scarlet, corolla plum-colour, striped rose; CANNELL'S GEM, tube and sepals glowing red, corolla pure white, cupped, good; CHARMING, tube and sepals red, corolla dark, showy and effective; DELIGHT, tube and sepals crimson, corolla bell-shaped, pure white, free and good; EARL OF BEACONSFIELD, rosy-carmine, corolla deep carmine, one of the best (this is a very remarkable hybrid—the seed-bearing parent being *F. fulgens*—raised, several years ago, by Mr. Laing; hitherto it has remained quite sterile) (see Fig. 55); ERECTA SUPERBA, a curious strong-growing garden hybrid, with flowers nearly erect (see Fig. 56); ETHEL, tube and sepals pure white, corolla violet; GAZELLE, dark red, a floriferous variety, of good habit; GENERAL GARFIELD, rich crimson, sepals broad, reflexed, corolla bluish; GRAND DUCHESS MARIE, tube white, corolla

Fuchsia—*continued.*

FIG. 55. FUCHSIA EARL OF BEACONSFIELD.

rose, free and good; INIMITABLE, sepals scarlet, broad, finely reflexed, corolla deep violet; JAMES LYE, tube and sepals red, corolla deep violet, good dark variety; JEANNE D'ARC, tube and sepals bright red, corolla pure white, extra good; JULES FERRY, scarlet, corolla violet, mottled white; LADY

FIG. 56. FLOWERING BRANCH OF FUCHSIA ERECTA SUPERBA.

Fuchsia—*continued.*

HEYTESBURY, white, corolla purple, free; LORD BYRON, bright crimson, corolla very dark, bell-shaped; LORD WOLSELEY, sepals broad, deep red, corolla rosy-crimson, margined purple, extra fine; LYE'S RIVAL, tube and sepals red, corolla violet-purple, very free; MARGINATA, white, corolla pink, margined with scarlet, of fine habit; MIGNONNE, tube and sepals bright red, corolla pure white, one of the best of its class; MR. J. HUNTLY, red, corolla plum-colour, showy dark variety; MRS. E. BENNETT, scarlet, corolla white, free; MRS. J. LYE, tube and sepals white, corolla pink, habit branching; MRS. KING, white,

FIG. 57. FLOWER OF FUCHSIA GIPSY QUEEN.

corolla rich carmine, good; MRS. MEIN, tube and sepals crimson-scarlet, latter well reflexed, corolla white; PINK PERFECTION, creamy-white, corolla violet; ROSE OF CASTILE, sepals blush, corolla purplish, good old variety; SEDAN, dark self-coloured variety, distinct and good; STAR OF WILTS, cream, corolla violet, very fine; SUNRAY, scarlet, corolla light purple, leaves crimson, bronze and white, very ornamental; THOMAS KING, tube and sepals coral-red, corolla rich deep purple; WAVE OF LIFE, sepals scarlet, corolla violet, a good old variety with yellow foliage

FIG. 58. FLOWER OF FUCHSIA MISS LUCY FINNIS.

Varieties with Double Flowers. ALFRED DUMESNIL, sepals clear crimson, corolla pale violet, long; AVALANCHE, carmine, corolla dark purple, one of the best doubles; CHAMPION OF THE WORLD, coral-red, corolla dark purple, produces, when fully developed, the largest flowers of any variety known; DE MONTALIVET, rosy-carmine, corolla violet, flaked, small full flower; GEM OF IPSWICH, tube and sepals coral-red, corolla purple, striped; GENERAL, sepals deep rose, much reflexed, corolla rich violet, striped; GIPSY QUEEN, sepals scarlet and much

Fuchsia—*continued.*

reflexed, corolla very full, violet (see Fig. 57); KING OF THE DOUBLES, scarlet, corolla purple, striped; KINGSBURYANA, scarlet, corolla pure white, and remarkable for its size and shape; LE CYGNE, tube and sepals crimson, corolla white, dwarf; LITTLE ALICE, scarlet, corolla pure white, good; MARKSMAN, sepals carmine, corolla violet, habit good; MARVELLOUS, tube and sepals rose, corolla blue, full; MILNE EDWARDS, coral-red, corolla bluish-violet; MINSTREL, rosy-crimson, corolla ivory-white, striped, full; MISS LUCY FINNIS, tube and sepals coral-red, corolla pure white, large and very full (see Fig. 58); MISS L. VIDLER, sepals crimson, corolla violet, good; MRS. H. CANNELL, sepals bright crimson, broad, corolla pure white, extra fine; NELLY MORTON, scarlet, corolla white; PIERRE JOIGNEAUX, sepals light red, corolla deep carmine, peculiarly formed.

FUEL AND FURNACES. The necessary annual supply of Fuel for heating purposes forms a considerable and very important item in garden expenditure. The bulk of that used in old-fashioned flues was coal, either as supplied from the pit or mixed with cinders. Since the introduction and general adoption of heating by hot water, coke has become a substitute in most cases where it can be obtained. The use of coal in large boilers would soon choke the flues with soot, and this is one important objection. Various gases are removed with the smoke in the manufacture of coal gas for burning, and the coke which remains contains about two-thirds of carbon, and forms the strongest heating combustible material available in quantity for horticultural purposes. The large pieces and those of medium size are of the best quality; the small, generally termed "breeze," being much inferior, and sold at a lower price. Combustion is first caused by heat, and it increases as the heat becomes more intense. A certain quantity of Fuel consumed inside a Furnace, transmits the heat evolved by combustion to the boiler, &c., surrounding it, or, if allowed, a great part passes to the chimney, where it is completely wasted. A draught, caused by the opening of the damper and ash-pit door at the same time, is a means whereby much oxygen is admitted to the fire, and a passage opened for the escape of the ascending heat. This is one of the principal things to avoid by using the damper, so that the greatest possible amount of heat may be utilised, with, at the same time, an economical use of Fuel in proportion.

FUGACIOUS. Lasting but a short time.

FUGOSIA (named in honour of Bernard Cienfugos, a Spanish botanist of the sixteenth century). SYNS. *Cienfuegia*, *Cienfugosia*, and *Redoutea*. ORD. *Malvaceæ*. A genus comprising about a score species of greenhouse evergreen shrubs or sub-shrubs, natives of tropical America, Africa, and Australia. Flowers often yellow, surrounded by an outer calyx or involucel of six or more leaves, within which is a five-cleft calyx dotted over with black spots, and five oblique petals. Leaves entire or lobed, rarely partite. Fugosias succeed in a peat and loam soil, to which a little silver sand may be added. Propagated by cuttings, made in April or May, and inserted under a bell glass, in mild bottom heat. The species here described are those usually seen in cultivation.

F. cuneiformis (wedge-shape-leaved). *fl.* red; petals about 1½in. long, slightly tomentose; involucre very small, minutely five or six-toothed, placed a little below the calyx; peduncles short and thick. June to August. *l.* cuneate-oblong or broadly linear-obtuse, 1in. to 2in. long, entire, thick and somewhat fleshy. *h.* 15ft. West Australia. Shrubby and glabrous. SYNS. *Hibiscus cuneiformis* and *Lagunaria cuneiformis*.

F. hakeæfolia (Hakea-leaved). *fl.* purple-lilac, large, on axillary peduncles, articulate, and often bearing a small bract about the middle; petals 1½in. to 2in. long. August. *l.* from deeply bipinnatifid to trifid only, or the upper ones entire, often several inches long, the whole leaf or lobes narrow-linear, somewhat fleshy, grooved above or almost terete. *h.* 8ft. to 10ft. South Australia, 1846. An erect shrub. (B. M. 4261.) SYNS. *Hibiscus hakeæfolius* and *H. multifidus* (P. F. G. vii. 103).

F. heterophylla (various-leaved). *fl.* yellow, with purple claws. June. *l.* ciliated, elliptical, entire, rarely trifid. *h.* 3ft. South America, 1822. SYN. *Redoutea heterophylla*. (B. M. 4218.)

FULIGINOUS. Dirty brown, verging upon black.

FULLER'S TEAZEL. *See* **Dipsacus Fullonum.**

FULVOUS. Dull yellow, with a mixture of grey and brown.

FUMANA. This genus is now included, by most authorities, under **Helianthemum** (which *see*). It forms a distinct section of that genus, and is characterised by its yellow flowers, narrow linear leaves, and erect habit.

FUMARIA (Spanish *fumaria*, from *fumus*, smoke; in allusion to the disagreeable smell of the plant, or to its poetical name, Smoke of the Earth). Fumitory. Including *Discocapnos* and *Platycapnos*. ORD. *Fumariaceæ*. A genus of perhaps a score species of annual (rarely perennial) herbs, usually branched, often climbing. Flowers small, in terminal or leaf-opposed racemes; petals four, erect, conniving, the posterior gibbous or spurred at the base, the anterior flat, two inner narrow, cohering by their tips, winged or keeled at the back. Leaves much divided; segments very narrow. No less than four species of this genus are found in Britain, but that described below is the only one worth growing. They are all of the easiest possible cultivation. Seeds may be sown in any ordinary soil, in spring.

F. capreolata (tendrilled).* *fl.* whitish, tinged with dark purple; spur compressed, blunt, short, mitre-formed; racemes oblong. May to September. *l.* bipinnate; petioles somewhat tendrilled. *h.* 4ft. Europe (Britain), Asia.

F. formosa (beautiful). A synonym of *Dicentra formosa*.

FUMARIACEÆ. An order of herbs, now included, by Bentham and Hooker, as a tribe of *Papaveraceæ*. Flowers irregular; sepals two, deciduous; petals four, in two usually very dissimilar pairs, cruciate, irregular, one or both of the outer pairs often saccate or spurred, and the two inner frequently cohering at the apex so as to include the anthers and stigma. Leaves alternate, usually divided, exstipulate. Stems brittle. The species possess slight bitterness and acridity, and are natives of the temperate and warm regions of the Northern hemisphere and of Southern Africa. Five of the seven genera are: *Adlumia*, *Corydalis*, *Dicentra*, *Fumaria*, and *Hypecoum*. There are about 100 species.

FUMIGATING. The process of destroying insects, principally Thrips and various Aphides, by means of tobacco smoke. Tobacco itself is seldom used for the operation, being too expensive. The various preparations supplied by nurserymen, or other firms of repute, as Fumigating mixtures, answer the same purpose most effectually. They are manufactured by soaking brown paper, pieces of rag, &c., in a strong solution of tobacco juice, and afterwards drying them for use. Only that which is known to be of good quality should be used, as valuable plants may be either injured or destroyed by the effects of smoke from material prepared from a solution containing injurious ingredients. A dull, still evening is best for Fumigating in any house or frame, as the smoke does not then escape so quickly. The leaves of the plants should, if possible, be dry at the time. The amount of smoke that may be allowed with safety, must depend on the hardiness of the subjects to withstand it. As a rule, it is always safer to moderately fill the structure on one evening, and again on the following morning, or on two successive evenings, than to run the risk of applying too much at once, with the intention of not repeating the operation. Fumigating may be practised with advantage, more as a preventative to the increase of insects, especially in spring. Care should be taken never to allow sunshine on a house with smoke inside, or tender plants are certain to be scorched. If still, rainy weather be selected, this is always avoided.

Fumigators are manufactured of various descriptions, but are not much used in large establishments, an open iron vessel, having a cross handle and a grating at the bottom, or some other means of a similar kind, being employed with equally good results. Most of the preparations of tobacco paper now sold burn without the use of bellows; consequently, the operator need not remain

Fumigating—*continued*

inside the house if the vessel containing the fire is placed near the door and carefully watched from the outside. The most important point is not to allow the material to flame. Some Fumigators have a perforated lid to prevent this. A layer of damp moss may also be used for a similar purpose where there is danger of ignition.

FUMITORY. *See* **Fumaria.**

FUNERAL CYPRESS. A common name of **Cupressus funebris** (which *see*).

FUNGI. A large class of cryptogams, distinguished from algæ more by habit than by any general character.

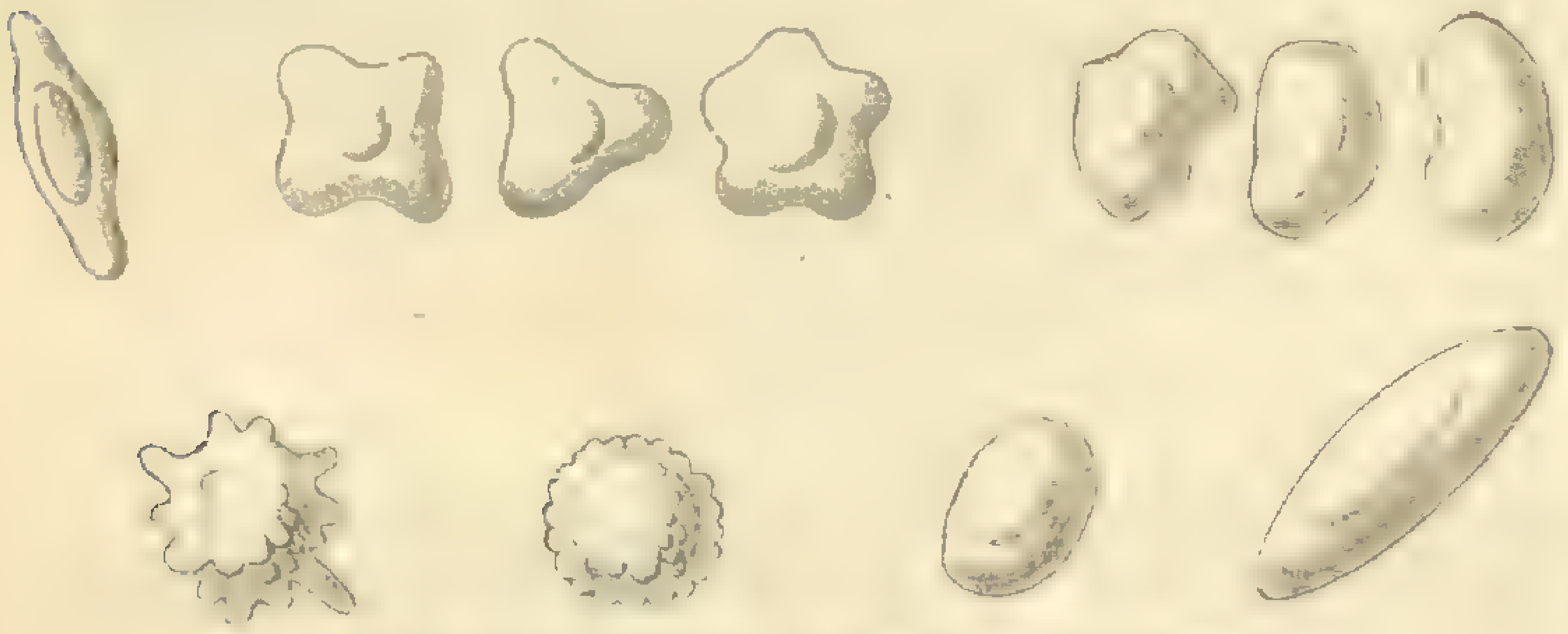


FIG. 59. SPORES OF FUNGI (AGARICUS).

"They are polymorphous, (often) ephemeral, annual or perennial, never green; composed either of filaments, or of a loose or close tissue, pulpy or fleshy, rarely woody; sometimes furnished with peculiar vessels, containing a white, yellow, or orange milky juice. They grow above or under ground, on decomposing vegetable or animal matter, or are parasites on vast numbers of phænogamous plants, and even on other Fungi. They are very rarely found on stones, or in water. In no particular can they be compared with phænogams, having no organs comparable with leaves and flowers. Among acotyledons, they approach algæ in their vegetation, and lichens in their fructification, but they have no fronds. Fungi have nearly the same geographical distribution as lichens; they are met with in the tropics, and in the coldest regions of both hemispheres, at the top of the highest mountains, beyond phænogamic

FIG. 60. CANDLESNUFF FUNGUS (XYLARIA HYPOXYLON).

vegetation. The smell of Fungi is not generally strong, and might be termed fungoid when it is mild and pleasant, like that of the Mousseron (*Agaricus albellus*). They are usually mild, and not very pleasant to the taste. Some are so extremely acrid that it would be dangerous to retain much of them in the mouth; however, this acridity disappears when they are properly cooked. Many species, as Truffles, Morels, and certain Agarics, are edible, and much sought after. Many others, which strongly resemble the preceding, and which nearly all belong to the genera *Agaricus* and *Lactarius*, are poisonous. To distinguish between edible and poisonous Fungi is a very difficult matter" (Léveillé). With the exception of the Ergot of Rye or Wheat, Fungi are now seldom employed in medicine. Fig. 59 shows spores of a number of species of the huge genus *Agaricus*. Most of the species of this genus have colourless spores, but in some they are pink, brown, or black; they are very variable in size; some, also, are smooth, whilst a few are rough or nodulose—especially amongst those in which the colour is pink. Fig. 60 represents the Candlesnuff Fungus which is frequently seen on decaying wood. Some of the minute Fungi—such as the *Peronospora infestans*, which attacks the potato and other Solanaceous plants—are extremely destructive, and amongst the worst pests against which the gardener has to contend.

FUNKIA (named after H. Funck, 1771-1839, a German botanist). Plantain Lily. SYNS. *Hosta*, *Saussurea* (of Salisbury). ORD. *Liliaceæ*. All the species of this genus (according to Mr. Baker) are described below. They are handsome, hardy, herbaceous plants. Flowers solitary in the axils of the bracts, forming a raceme. Leaves broadly ovate or cordate. Roots tuberous, fascicled. These fine plants are admirably adapted for the lawn, shrubbery border, beds, or rockwork; and, when grown in pots, they form very effective subjects for the greenhouse or conservatory. They thrive best when the ground, in which they are to be grown, is deeply dug, and well enriched with rotten manure. Propagation may be effected by cutting the crowns through with a sharp spade during winter, or when they begin to start

FIG. 61. FUNKIA SIEBOLDIANA.

Funkia—*continued.*

in spring. The latter season is, perhaps, the most suitable, as the mutilated parts then quickly heal. None but strong, healthy clumps should be divided, and each portion should comprise several crowns. The genus is in a state of much confusion, from the number of garden varieties and synonyms.

F. Fortunei (Fortune's). *fl.*, perianth pale lilac, funnel-shaped, 1½in. long, the lanceolate ascending divisions half as long as the tube. July. *l.* six or eight to a stem; blade cordate-ovate, cuspidate, pale green on both sides, conspicuously and persistently glaucous, furnished with ten or twelve arching veins on each side, between the midrib and the margin. *h.* 1½ft. Japan, 1876.

F. grandiflora (large-flowered).* *fl.* fragrant; perianth pure white, nearly 4in. long, dilated gradually from a tube ⅓in. thick; scape about 2ft. high, bearing a twelve to fifteen-flowered raceme. July to September. *l.* ovate, with a slightly cordate base, 8in. to 9in. long, 4½in. to 5in. broad; petiole 1ft. long; edges incurved until they meet. Japan. SYN. *F. japonica.* (F. d. S. 158; G. C. n. s., x. 629.)

F. japonica (Japanese). A synonym of *F. grandiflora.*

F. lancifolia (lance-leaved). *fl.*, perianth white or with a lilac tinge, 1in. to 1½in. long, dilated suddenly from a tube not more than a line in thickness; scape 8in. or 9in. high, slender, with the raceme hardly, if at all, overtopping the leaves; raceme 3in. to 5in. long, six to ten-flowered. August. *l.* green, lanceolate, 4in. to 5in. long, 1½in. to 2in. broad, narrowed gradually towards both ends; petiole 6in. to 9in. long; edges not incurved. Japan, 1829. (B. M. 3663.) *F. albo-marginata* only differs by its rather larger flowers and leaves, slightly variegated towards the edge with white. *F. undulata* is another garden form with irregularly frilled or crisped leaves, which are copiously variegated with streaks or large patches of white.

F. ovata (ovate).* *fl.*, perianth bluish-lilac or white, 1½in. to 2in. long, dilated suddenly from a tube ⅛in. in thickness; scape 1ft. to 1½ft. long, overtopping the leaves; raceme ten to fifteen-flowered. May. *l.* ovate, 5in. to 9in. long, 3in. to 5in. broad; petiole 4in. to 12in. long; edges not incurved. Japan, Northern China and Eastern Siberia, 1790. The commonest and best-known species. SYN. *Hemerocallis cærulea.* (B. M. 894.)

F. o. marginata (margined).* A variety in which the leaves are broadly margined with white.

F. Sieboldiana (Siebold's).* *fl.*, perianth white, with a pale lilac tinge, 2in. to 2½in. long; scape with the raceme not overtopping the leaves; racemes 4in. to 6in. long, ten to fifteen-flowered. June. *l.* glaucous, broadly cordate-ovate, 10in. to 12in. long, 7in. to 8in. broad; petiole 8in. to 12in. long, edges not incurved. Japan, 1836. See Fig. 61. (B. R. 1839, 50.)

FIG. 62. FUNKIA SUBCORDATA.

F. subcordata (sub-cordate).* *fl.*, perianth pure white, 4in. to 4½in. long, gradually dilated from a tube ⅓in. in thickness; scape 1½ft. to 2ft. long; raceme nine to fifteen-flowered. August. *l.* cordate-ovate, pale green, 6in. to 9in. long, 3in. to 5in. broad; petiole 6in. to 8in. long. Japan, 1830. SYNS. *Hemerocallis alba* (A. B. R. 194), *H. cordata*, *H. japonica* (B. M. 1433), *H. plantaginea.* See Fig. 62.

FURCATE. Forked.

FURCRÆA (named in honour of A. F. Fourcroy, 1755-1809, a celebrated French chemist). SYN. *Fourcroya.* ORD. *Amaryllideæ.* A genus of about fifteen species of very noble greenhouse or stove plants, closely allied to *Agave*, but with horizontally spreading perianth segments. For culture, &c., *see* **Agave.**

Furcræa—*continued.*

F. Bedinghausii (Bedinghausen's).* *fl.* greenish; scape 12ft. to 15ft. high; branches drooping. *l.* thirty to fifty in a rosette, lanceolate, about 3ft. long; margin minutely denticulate. Trunk 3ft. high. Mexico, 1860. SYNS. *Roezlia regia, Yucca argyrophylla, Y. Parmentieri, Y. Toneliana.*

FIG. 63. FURCRÆA CUBENSIS, showing Inflorescence, with Bulbils developed instead of Flowers.

F. cubensis (Cuban).* *fl.* greenish. Autumn. *l.* twenty-five to thirty in a rosette, bright green, rigid in texture, channelled and smooth down the face, generally scabrous on the back, the end a minute brown, scarcely pungent point; edge armed with regular hooked brown prickles. Tropical America, 1879. One of the commonest and best known of all the species. See Fig. 63.

F. c. inermis (unarmed). This plant differs from the ordinary *F. cubensis* by its less rigid leaves, and by the total or almost entire suppression of the marginal teeth, which in the type are very close and large, and armed with pungent horny brown spines. Tropical America. (B. M. 6543.)

F. elegans (elegant).* *fl.* greenish-white; scape 20ft. to 25ft. high. *l.* forty to fifty in a rosette, lanceolate, 5ft. to 6ft. long; prickles brown, hooked, horny. Mexico, 1868 Plant stemless. SYNS. *F. Ghiesbreghtii, F. pugioniformis.*

F. flavo-viridis (yellow-green). *fl.*, perianth pale yellowish-green; tube incorporated with the obtusely triangular ovary; scape 12ft. to 14ft. high, naked below, but bracteated above, forming a long, loose, racemose panicle. *l.* radical, more or less spreading, and somewhat tortuose, lanceolate, pungently acuminate, spinulose at the margin. *h.* 14ft. Mexico, 1846. (B. M. 5163.)

F. fœtida (fœtid). A synonym of *F. gigantea.*

F. Ghiesbreghtii (Ghiesbreght's). A synonym of *F. elegans.*

F. gigantea (gigantic).* *fl.* milk-white inside, greenish on the back outside; scape 20ft. to 30ft. high. *l.* forty to fifty in a dense

Furcræa—*continued.*

rosette, lanceolate, 4ft. to 6ft. long; margin usually entire. Trunk 2ft. to 4ft. high. South America, 1690. SYN. *F. fœtida.* See Figs. 64 and 65.

FIG. 64. FURCRÆA GIGANTEA.

F. longæva (long-lived).* *fl.* whitish; scape 30ft. to 40ft. long; branches spreading, compound. *l.* numerous, in a dense rosette, lanceolate, 4ft. to 5ft. long. Trunk about 3ft. to 4ft., but, in a wild state, said to reach 40ft. to 50ft., in height. Mexico, 1833. This is probably the handsomest species of the genus; it is perfectly hardy in the open at the Scilly Isles, where it has frequently flowered. (B. M. 5519.)

F. pugioniformis (dagger-shaped). A synonym of *F. elegans.*

F. Selloa (Sello's). *fl.* white, tinged with green; scape 15ft. to 16ft. long; panicle 3ft. broad. *l.* thirty to forty in a dense rosette, lanceolate, 3ft. to 4ft. long; margin with upcurved brown spines about ½in. long. Trunk none or scarcely any. (B. M. 6148.)

F. undulata (waved).* *fl.* all drooping, usually in pairs; perianth pale green; segments narrow-oblong, obtuse, obtusely keeled down the centre. November. *l.* forming a flat crown 3in. in diameter, not very numerous, strict, spreading, thick, ensiform, long acuminate, terminated by a pungent chestnut-brown spine, obscurely keeled at the back, which is scabrid; margin subundulate, with incurved chestnut-coloured stout spines. Stem none, or very short. *h.* 10ft. Mexico, 1868. (B. M. 6160.)

FURFURACEOUS. Scaly, mealy, scurfy.

FURNACES. *See* **Fuel and Furnaces.**

FURZE. *See* **Ulex europæus.**

FUSIFORM. Spindle-shaped, like the root of a Carrot.

GÆRTNERA (named after Dr. Joseph Gærtner, a celebrated German botanist, 1732-1791). SYNS. *Frutesca, Sykesia.* ORD. *Loganiaceæ.* A genus containing about twenty-five species of handsome stove glabrous shrubs or trees, natives of West Africa, Mauritius, Madagascar, and the Malayan Islands and Peninsula. Flowers white, green, or rose-coloured; in some species, not unlike those of the common Privet, and arranged in a similar manner; in others, disposed in compact terminal heads; and in others in corymbs; calyx usually very minute. Leaves opposite, entire, coriaceous, penniveined. They thrive in a mixture of loam and peat. Cuttings of firm shoots, made in April, will root, if inserted in sand, under a hand glass, in heat. The species here described are those best known in cultivation.

G. obtusifolia (obtuse-leaved). *fl.* composed of five petals, the lower two more expanded, the upper three completely reflexed, the uppermost one has a rosy tinge round a yellowish base, the other four are white; fragrant. March. *l.* oblong, obtuse. *h.* 20ft. China, 1810. A large shrub.

G. racemosa (racemose).* *fl.* somewhat resembling *G. obtusifolia*, but larger, more beautiful, and exceedingly fragrant; exterior petals oblong. April. *l.* ovate-oblong, acute. Various parts of India, 1793. A very handsome species. (A. B. R. 600.)

GAGEA (named after Sir Thomas Gage, a British botanist, who died at Rome in 1820). ORD. *Liliaceæ.* A genus of about a score species of hardy bulbs, natives of Europe, temperate Asia, and Northern Africa; formerly

FIG. 65. BRANCH OF INFLORESCENCE, AND SINGLE FLOWER, OF FURCRÆA GIGANTEA.

Gagea—*continued.*

included under *Ornithogalum.* Flowers greenish-yellow, on a scape, in a terminal bracteated umbel. Leaves radical, linear. The species closely resemble each other; but few of them, however, are seen in gardens. For culture, *see* **Ornithogalum.**

G. lutea (yellow).* Yellow Star of Bethlehem. *fl.* three or four in a flat raceme, almost contracted into an umbel; the leaf-like bracts as long as the pedicels or longer; perianth segments yellow, with a green back, very spreading, narrow-oblong. Spring. *l.* one, or very rarely two, linear, pointed and curved like those of a Tulip. Stem slender, rarely 6in. high. Europe and Russian Asia, except the extreme North; also occurring in several parts of England, and, but rarely, in the Lowlands of Scotland. (Sy. En. B. 1522.)

G. stenopetala (narrow-petaled). *fl.* in umbels; perianth pale yellow, deeply six-parted. March. *l.*, root ones solitary, glaucous, revolute, linear-lanceolate, acute, strongly three-nerved; scape leaves opposite, lanceolate, acute, sharply keeled, glaucous, pubescent, and fringed with long hairs. Europe. (S. B. F. G. 177, under name of *G. glauca.*)

GAGNEBINA (named in honour of P. Gagnebin, a botanical writer of the seventeenth century). ORD. *Leguminosæ.* An elegant, unarmed, stove evergreen shrub, closely allied to **Mimosa** (which *see* for cultivation).

G. tamariscina (Tamarix-like). *fl.* yellow; spikes crowded at the top of the branches, disposed in a kind of racemose corymb. *l.* with about twenty pairs of pinnæ, each pinna bearing about thirty pairs of leaflets. *h.* 6ft. Mauritius, 1824.

GAILLARDIA (named in honour of M. Gaillard, a French patron of botany). ORD. *Compositæ.* A genus of very ornamental hardy annual or perennial herbaceous plants, natives of North and extra-tropical South America. Flower-heads yellow or purple, 2in. across, single, and supported on naked stalks; ray-florets three to five-toothed, often two-coloured; receptacle furnished with filiform bristles between the florets. Leaves sometimes pinnatifid, but usually entire or obscurely toothed, lance-shaped and rough; the cauline ones sessile. There are about eight species, all thriving in a good light friable soil, in masses. Propagation may be effected by cuttings, in autumn or spring; also by division, in the latter season. In cold localities, the perennial species frequently die in winter: in this case, seeds should be sown on a mild hotbed, in February or March. The best method of propagating the annuals is by cuttings, which are readily obtainable, as these form far superior plants to those procured from seed.

FIG. 66. FLOWERING BRANCH OF GAILLARDIA ARISTATA GRANDIFLORA.

G. amblyodon (blunt-toothed).* *fl.-heads* terminal, peduncled; ray-florets deep blood-red, twelve to fourteen, spreading; limb cuneate-oblong, obtusely three-lobed; disk-florets short. October. *l.*, radical ones sub-spathulate; cauline ones semi-amplexicaul, oblong, sub-acute, coarsely toothed beyond the middle, usually contracted below it. *h.* 2ft. to 3ft. Texas, 1873. Annual. (B. M. 6081.)

G. aristata (awned).* *fl.-heads* yellow, with prominent exserted reddish styles in the disk, 1in. to 3in. across. Autumn. *l.* lanceolate, entire, or remotely toothed. *h.* 1½ft. United States, 1812. Perennial. (B. M. 2940.) There are several very handsome varieties of this species; notably *grandiflora* (see Fig. 66), (Gn., Dec. 13, 1884), and *grandiflora maxima.*

G. pulchella (neat).* *fl.-heads* larger than those of the first-named species; ray-florets crimson, tipped with bright yellow. Autumn. *l.* coarsely and sparsely toothed. *h.* 2ft. to 3ft. Annual. (B. M. 1602, under name of *G. bicolor.*) A new form, named *Lorenziana*, is very handsome and unique in appearance: the ray and disk-florets develop themselves into tubular funnel-shaped three to five-lobed florets, and form handsome flower-heads, which are admirably adapted for cutting. Another variety, *nana*, is a fine free-flowering form of good compact habit, and with large flowers, which are reddish-crimson, bordered with citron-yellow.

G. p. picta (painted).* A form with somewhat succulent leaves, and the more or less subulate fimbrillæ of the receptacle shorter and stouter. (B. M. 3368, under name of *G. bicolor Drummondii.*)

The following are mere garden names for slightly-varying forms of the foregoing species: *Bosselari, coronata, hybrida, Loiselli, Richardsoni,* and *Telemachi.* *G. pinnatifida* is a species not often seen in cultivation.

GALACTIA PINNATA. A synonym of *Barbieria polyphylla.*

GALACTITES (from *gala, galaktos,* milk; in allusion to the veins of the leaves being milk-white). ORD. *Compositæ.* A genus of hardy annual or biennial erect herbs, nearly allied to *Cnicus,* from which it differs chiefly in the outer florets of the flower-head being sterile and larger than the others, as in *Centaurea.* Leaves pinnatifid, with spiny-pointed segments, spotted with white above, and covered with cotton-down below. There are three species, all inhabiting the Mediterranean region. They thrive in any common garden soil, and may be propagated by seed, sown in the flower border, in March or April. The species here described is the one best known to cultivation.

G. tomentosa (woolly). *fl.-heads* purple, pedunculate. July. *h.* 1½ft. 1738. This species is remarkable among the thistles for having a milky juice, similar to that so frequently found in the Chicory group.

GALACTODENDRON (from *gala,* milk, and *dendron,* a tree; in reference to the copious milky juice). Cow-tree. ORD. *Urticaceæ.* This genus is now usually referred to *Brosimum.* It is only met with in botanic gardens.

G. utile (useful), the Palo de Vaca, first described by Humboldt, is a native of Venezuela, where it forms large forests, and attains a height of upwards of 100ft., with a smooth trunk, 6ft. or 8ft. in diameter. On incisions being made in the trunk, the natives obtain an abundant supply of milky sap, which is extensively employed by them as a substitute for milk. (B. M. 3723, 3724.)

GALANTHUS (from *gala,* milk, and *anthos,* a flower, in reference to the milk-white flowers). Snowdrop. ORD. *Amaryllideæ.* A well-known genus, containing three species of hardy bulbous plants. It is distinguished from *Leucoium* principally in having the three inner segments of the perianth shorter than the outer. Snowdrops are well-known and general favourites, on account of the modest beauty displayed by their flowers at the early season in which they appear; hence, no word of recommendation is needed to insure their cultivation, which is of the simplest description, as the roots thrive in almost any soil or position outside. When once planted, it is best to let them take care of themselves, as lifting has a tendency to dry the bulbs, which is not desirable if it can be avoided. Snowdrops are cheap and attractive subjects for naturalising in grass, by woodland drives, &c.,

Galanthus—*continued.*

as, if planted where the soil is suitable, and left alone, they increase rapidly, and annually appear to flower almost suddenly, about the beginning of February.

Pot Culture. If a number of roots are purchased with the ordinary Dutch bulbs in autumn, and about eight placed in a 5in. pot, an interesting addition may be ob-

FIG. 67. FLOWERS OF GALANTHUS ELWESII.

tained for greenhouse decoration in January. Snowdrops will not bear forcing, and, if it is attempted, failure in securing flowers is almost certain. After potting, they should be covered with ashes until growth commences. The pots should then be removed and kept in a light

FIG. 68. GALANTHUS NIVALIS.

Galanthus—*continued.*

FIG. 69. FLOWERS OF GALANTHUS NIVALIS IMPERATI.

position in a cold frame, giving plenty of air at all times when the weather is mild. Both the single and

FIG. 70. FLOWERS OF GALANTHUS NIVALIS REFLEXUS (CRIMEAN SNOWDROP).

Galanthus—*continued.*

double forms seldom fail to flower when treated in this way.

G. Elwesii (Elwes's).* *fl.*, petals (inner perianth segments) constricted above the middle, slightly notched at the apex, and marked with green spots at the base. *l.* twisted within the sheath, not folded. *h.* 6in. to 12in. Asia Minor, 1875. A very distinct large-flowered form, and said to be the finest of the genus. (B. M. 6166.)

G. nivalis (snowy).* Common Snowdrop. *fl.* with white perianth segments, the three inner streaked with green on the inside, and having a spot of the same colour on the outside, pendulous. *l.* keeled, linear, obtuse, usually in twos. Bulb ovate. *h.* 4in. to 6in. Europe. This well-known plant has a number of more or less distinct varieties. *Imperati* is a very large form, with outer segments of the flower very abrupt and narrow at the base (see Fig. 69) (G. C. n. s., xi. 237); *latifolius* (= *Redoutei*) differs only in its very broad strap-shaped leaves (G. C. n. s., xv. 404); *major*; *reflexus*, with outer perianth segments reflexed (see Fig. 70);

FIG. 71. FLOWERS OF GALANTHUS NIVALIS VIRESCENS.

Shaylockii (G. C. n. s., xi. 343); and *virescens*, with inner segments all over green (see Fig. 71), are varieties. There is also a well-known double form.

G. plicatus (folded).* *fl.* somewhat similar to those of *G. nivalis*, but sometimes smaller, and of a greenish hue. *l.* with a longitudinal fold on both sides near the edge, whence the specific name. *h.* 6in. Crimea, 1818. This rare species is, with the exception of the flower, larger in all its parts than *G. nivalis*, but is not, however, so pretty. (B. M. 2162; G. C., n. s., xi. 236.)

GALATELLA. This genus is now included, by Bentham and Hooker, under *Aster.*

GALAX (from *gala*, milk; referring to the milk-white flowers). SYNS. *Erythrorhiza* and *Solenandra.* ORD. *Diapensiaceæ.* An elegant little hardy herbaceous perennial, particularly suitable for growing on rockwork. It thrives best in a compost of nearly all leaf mould, rather damp, with the addition of a small quantity of loam and charcoal, but will succeed in almost any soil, in a cool, damp place. Propagated by divisions of well-grown clumps, in autumn.

G. aphylla (naked-stemmed).* *fl.* white, small, numerous, produced at the apex of the slender, elongated, naked scape, in a loose, spicate raceme. July. *l.* round-cordate, thickly crenate-dentate, veiny, thin, but persistent over winter, rather shining, long-petioled. *h.* 3in. to 6in. North America, 1756. See Fig. 72. (B. M. 754; A. B. R. 343, under name of *Blandfordia cordata.*)

FIG. 72. GALAX APHYLLA, showing Habit and detached Inflorescence.

GALAXIA (from *gala*, *galaktos*, milk; referring to the juice). ORD. *Irideæ.* A genus of two or three species of very pretty greenhouse bulbous plants, natives of the Cape of Good Hope. Flowers, perianth funnel-shaped, with a slender terete tube, and a six-parted, equal limb of oblong, wedge-shaped, spreading segments. Leaves linear or rather broad, sheathing at the base. The species will succeed out of doors, planted in a warm, sheltered spot, if afforded some slight protection in winter; it is, however, safer to grow them in pots, in a cool greenhouse. They are of easy culture in sandy peat, with a little fibry loam added. Propagated by offsets.

G. graminea (grass). *fl.* light yellow; spathe one-valved, one-flowered. July. *l.* linear, filiform, dilated at base. 1795. Plant almost stemless. (B. M. 1292.)

G. ovata (ovate).* *fl.* dark yellow; spathe one-valved, one-flowered. May to September. *l.* oblong. 1799. Plant almost stemless. (B. M. 1208.)

GALBANUM. The name of an aromatic gum-resin issuing from the stems of several plants of the Carrot family, *Ferula galbaniflua* and *F. rubricaulis*, &c.

GALEANDRA (from *galea*, a helmet, and *aner*, *andros*, a stamen; referring to the crested male organ on the top of the column). ORD. *Orchideæ.* A genus of about half-a-score species of stove terrestrial orchids (included by some authors under *Eulophia*), natives of tropical America, from Brazil to Mexico; having slender, erect, fleshy, jointed stems, from the tops of which the flower-spikes are produced, just after the growth is finished. Leaves narrow, lanceolate, two-ranked, sheathing. The species are somewhat difficult to cultivate, and require strict attention during the growing season, in order to keep the leaves free from the attacks of Red Spider and Thrips. This may be done by syringing them twice a day in warm weather. Galeandras should be cultivated in pots of peat, in the East-Indian house. When growing, a plentiful supply of water should be given; but while at rest, they should be placed near the glass, in a Cattleya house, and kept moderately moist.

G. Baueri lutea (Bauer's yellow).* *fl.* yellow, beautiful, in drooping racemes; lip with parallel purple lines near the apex, which has wavy margins. June to August. *l.* veined, lance-shaped. Stems cylindrical. *h.* 6in. Guiana, 1840. A very rare but desirable species. (B. M. 4701.)

G. cristata (crested). *fl.* pink and dark purple; spike drooping. June to August. *h.* 1½ft. South America, 1844.

Galeandra—*continued.*

G. Devoniana (Duke of Devonshire's).* *fl.* white, elegantly pencilled with pink, about 4in. across, produced in pendent spikes from the top of the pseudo-bulbs. Blossoms at various times of the year, and remains a considerable period in full beauty. *h.* 2ft. South America. (B. M. 4610.)

G. Harveyana (Harvey's). *fl.*, sepals and petals sepia-brown; lip light yellow, with a tuft of hair over the anterior part of the disk. Tropical America.

G. minax (projecting). *fl.* yellowish-copper, whitish, purple. June. Columbia, 1874.

G. nivalis (snowy).* *fl.* in nodding racemes, each about 2in. long, with narrow reflexed rich olive-coloured segments, having a large funnel-shaped white lip, marked with a central violet blotch. Tropical America. A beautiful and rare species. (G. C. n. s., xvii. 537.)

GALEATE. Helmeted.

GALEGA (from *gala*, milk; referring to its supposed property of increasing the milk of animals which feed upon the plants). Goat's Rue. ORD. *Leguminosæ.* A genus comprising three species of ornamental, hardy, smooth, erect perennial herbs, natives of Southern Europe and Western Asia. Flowers white or blue, disposed in axillary and terminal racemes. Leaves impari-pinnate; leaflets entire, veined; stipules somewhat sagittate. The species succeed in almost any soil, but will well repay for liberal treatment. They succeed in rich loam, with a sunny situation, and can remain year after year in one position. It is, however, advisable to divide them every few years. Propagation is effected by dividing the roots into several strong pieces, and replanting them in a deeply dug soil, and in a position where they are intended to flower; or by seeds, sown in the open ground, in spring.

G. officinalis (officinal).* *fl.* blue; racemes longer than the leaves. Summer. *l.* lanceolate, mucronate, glabrous; stipules broad-lanceolate. *h.* 3ft. to 4ft. South Europe, 1568.

G. o. albiflora (white-flowered)* is a pretty white-flowered form. *h.* 2ft. to 3ft. Persia, 1823. SYN. *G. persica.*

FIG. 73. GALEGA ORIENTALIS, showing Flowering Stem and detached Single Flower.

G. orientalis (Eastern).* *fl.* blue; racemes longer than the leaves. Summer and autumn. *l.* ovate, acuminated, smooth; stipules broad-ovate. *h.* 2ft. to 4ft. Caucasus, 1810. This species may be distinguished by its creeping roots and simple, flexuous stems. See Fig. 73. (B. M. 2192.)

G. persica (Persian). A synonym of *G. officinalis albiflora.*

GALEOBDOLON. Included under **Lamium.**

GALEOGLOSSUM. A synonym of **Prescottia** (which *see*).

GALEOLA (a diminutive of *galea*, a helmet; in allusion to the form of the labellum). Including *Cyrtosia*, *Erythrorchis*, &c. ORD. *Orchideæ.* A genus of about a dozen species of leafless epiphytes, sometimes climbing to a considerable extent. They are natives of India, Japan, the Malayan Archipelago, New Caledonia, and Australia. Flowers in terminal, usually pendulous, panicles. Some of the species are decidedly showy; but, probably, none are successfully cultivated in this country.

GALEOPSIS (the old Greek name used by Dioscorides, from *gale*, a weasel, and *opsis*, appearance; in allusion to the likeness of the flower to a weasel's snout). SYN. *Tetrahit.* ORD. *Labiatæ.* This genus, according to some authorities, contains twelve species of hardy, erect, or slightly decumbent, annual herbs; whilst others reduce the number of species to three. They are natives of Europe and West Asia. Flowers red, yellow, or variegated, sessile; calyx nearly regular, with five pointed teeth; corolla with a tube larger than the calyx. The species thrive in any ordinary garden soil, and are propagated by seed.

G. Ladanum (Ladanum). *fl.* purple, six to ten together, in dense whorls in the upper axils, the upper ones forming a terminal head. Summer and autumn. *l.* shortly stalked, narrow-ovate or lanceolate, coarsely toothed. *h.* 8in. to 9in. This species varies considerably in the breadth of leaf, in the degree of hairiness, and in the size of the flowers. (Sy. En. B. 1074, 1075.)

G. versicolor (various-coloured). *fl.* yellow, with a purple spot on the lower lip, large. Summer and autumn. *l.* stalked, ovate, very pointed, and coarsely toothed. Stem hispid. This is considered by some authors to be a variety of *G. Tetrahit*, a common cornfield weed in Britain. (Sy. En. B. 1077.)

GALEOPSIS (of Mœnch). A synonym of **Stachys.**

GALEOTTIA. Included under **Zygopetalum.**

GALE, SWEET. *See* **Myrica Gale.**

GALIACEÆ. A tribe of *Rubiaceæ.*

GALINGALE. A common name of **Cyperus longus** (which *see*).

GALIPEA (native name of one of the species). ORD. *Rutaceæ.* A genus comprising about twenty species of stove evergreen trees or shrubs, natives of South-eastern tropical America. Racemes axillary or terminal, simple or compound. Leaves alternate, petiolate, one to seven-foliolate; leaflets entire, rarely serrated, full of pellucid dots. For culture, *see* **Erythrochiton.**

G. macrophylla (large-leaved). *fl.* pale rose or white, in a stalked interrupted spike or raceme. *l.* unifoliolate, elliptic, glabrous, obtuse, somewhat leathery, 6in. to 12in. long. *h.* 2ft. Brazil. (B. M. 4948.)

G. odoratissima (very sweet-scented). *fl.* white, very fragrant, in many-flowered, sub-sessile, short, axillary spikes. May. *l.* deep green, broad, obovate, obtuse, shortly petiolate. *h.* 2ft. Rio Janeiro. (B. R. 1420.)

G. trifoliata (three-leaved). *fl.* greenish, small, corymbose. September. *l.* trifoliate, smooth. *h.* 6ft. Guiana.

GALIUM (*Galion*, the old Greek name used by Dioscorides, from *gala*, milk; the flowers of one of the species having been used to curdle milk). Bedstraw. ORD. *Rubiaceæ.* An extensive genus of annual or perennial herbs, spread over the whole of the temperate regions of the New, as well as of the Old World, especially abundant in Europe and Northern Asia, penetrating also into the tropics, but there chiefly confined to mountainous districts. The species number 150, and are, for the most part, uninteresting weeds; the following, however, may be employed to cover rockwork: *maritinum*, *purpureum*, *rubrum*, and *uliginosum.* Flowers white, yellow, or (in

Galium—*continued.*

exotic species) red, in axillary or terminal trichotomous cymes or panicles, sometimes reduced to small clusters; calyx completely combined with the ovary; corolla rotate, the tube scarcely perceptible, with four spreading lobes. The annuals require to be sown in any ordinary border, in March; the perennials should be divided at the same time. The genus is represented in the British flora by eleven species, the flowers of one of which—the golden-yellow-flowered Lady's Bedstraw, *G. verum*—are used in some districts to curdle milk, hence one of its popular names, Cheese Rennet.

GALLS. Excrescences of various kinds, produced by the deposit of the eggs of insects in the bark or leaves of plants. What is commonly known as the Oak Apple is caused by a Gall Fly (*Andricus terminalis*). When cut longitudinally, the Gall is seen to inclose a great number of granules, each containing a minute larva. The Rose Bedeguar, frequently seen on the Wild Rose, is the work of another Gall Fly (*Rhodites rosæ*). *Cynips aptera*, a hymenopterous wingless fly, causes large roundish Galls on the roots of the Oak, Elm, Beech, and other trees. Illustrations of the insect and the Galls it makes are given in the "Gardeners' Chronicle," n. s., i. 19.

GALPHIMIA (an anagram of *Malpighia*). ORD. *Malpighiaceæ.* This genus comprises about a dozen species of handsome stove evergreen shrubs, inhabitants of tropical and sub-tropical North America and Brazil. Flowers yellow or reddish, in terminal racemes. Leaves opposite, small. Galphimias thrive in a compost of peat and loam. Cuttings, made of the ripened wood, will root in sand, under a bell glass, in heat.

G. glandulosa (glandular). *fl.* yellow; petals oblong. April. *l.* oval-lanceolate, smooth; petioles with two large glands at top. *h.* 3ft. to 4ft. Mexico, 1824.

G. glauca (glaucous).* *fl.* yellow. *l.* ovate, obtuse, smooth, glaucous beneath, and with one tooth on each side at the base; petioles without glands. Mexico, 1830. (B. H. 8, 45.)

G. hirsuta (hairy). *fl.* yellow. September. *l.* ovate, acute, on short footstalks, hairy on both surfaces. *h.* 6ft. Mexico, 1824.

FIG. 74. GALTONIA CANDICANS, showing Habit and detached Single Flower.

GALTONIA (name commemorative of Francis Galton, author of a "Narrative of an Explorer in South Africa"). ORD. *Liliaceæ.* A genus of a couple of species of very beautiful hardy bulbous plants, natives of South Africa. They are admirably adapted for growing in clumps in

Galtonia—*continued.*

borders, or for conservatory decoration. They prefer a rich leaf mould, with a little sandy peat added. Propagated by offsets, or by seeds.

G. candicans (white).* *fl.* pure white, large, fragrant, drooping, funnel-shaped; raceme about 1ft. long, fifteen to twenty-flowered; scape (inclusive of raceme) erect, glaucous, about 4ft. long. Summer. *l.* lorate-lanceolate, sub-erect, 2½ft. long. Bulb large, round. SYN. *Hyacinthus candicans.* See Fig. 74. (R. H. 1882, 32.)

G. princeps (prince). This is closely allied to the foregoing, but less ornamental, with broader and shorter racemes and smaller, greenish flowers, with spreading segments. (Ref. B. 175.)

GAMOCHLAMYS. Included under **Spathantheum.**

GAMOSEPALOUS. When the sepals are joined together.

GARCIANA. A synonym of **Philydrum.**

GARCINIA (named in honour of Laurence Garcin, M.D., a French botanist and traveller in India, author of numerous botanical memoirs). SYNS. *Cambogia*, *Mangostana*, and *Oxycarpus.* ORD. *Guttiferæ.* A genus comprising about forty species of stove evergreen fruit-bearing trees. Flowers usually solitary at the tops of the branches. The fruit is very delicious and refreshing. Leaves coriaceous or rarely sub-membranaceous. Garcinias thrive in a peat and loam compost. Cuttings of ripened shoots will root, if inserted in sand, under a glass, in strong bottom heat. The species here described are, perhaps, the best known to cultivation.

G. Cambogia. Gamboge. *fl.* yellow, terminal, solitary. November. *fr.* about 2in. in diameter, drooping, on peduncles 1in. in length. *l.* elliptic, tapering to both ends, 5in. long. *h.* 40ft. Branches spreading, opposite. East Indies, 1822. (B. F. S. 85.)

G. cornea (horny). *fl.* pale yellow, scentless, terminal. January and February. Berry nearly round, the size of a medlar, covered with a dark purple juiceless bark. *l.* opposite, oblong. *h.* 20ft. East Indies, 1823.

G. Cowa (Cowa). *fl.* yellow, terminal. February. *fr.* edible, though not the most palatable. *l.* broad-lanceolate. *h.* 60ft. Chittagong, 1822. A middle-sized handsome tree, yielding an inferior kind of gamboge.

G. Mangostana.* Mangosteen. *fl.* red, resembling a single rose, composed of four roundish petals, which are thick at the base, but thinner towards the margins, terminal, solitary. *fr.* round, about the size of a medium orange; it is esteemed one of the most delicious fruits in the world. *l.* elliptic-oblong, acuminated, 7in. or 8in. long. *h.* 20ft. Molucca Islands, 1789. (B. M. 4847.)

G. Morella (Morella). *fl.* yellowish; panicles terminal and lateral. *fr.* small, edible, in shape and size resembling the Morello Cherry (whence the specific name). *l.* oblong-elliptic, tapering to both ends. *h.* 30ft. to 50ft. Ceylon, Siam, East Indies, &c. This plant yields the Ceylon gamboge of commerce. (B. F. S. 87.)

GARDEN. A Garden is usually understood to mean a piece of land of any description or size, attached to, or connected with, a residence, and set apart, either for the purpose of growing vegetables and fruits for the supply of the household, or for the cultivation of plants and flowers for the embellishment of any part of the house or the Garden itself. The results attending the culture of vegetables and fruits are of the greatest national importance, as representing a necessary source for supplying wholesome food, which it would be impossible to obtain unless care were bestowed in preparing the land and cultivating the crops annually, according as each may require. Flowers, and the plants specially grown for producing them, have a universal charm, presenting a means of endless study and enjoyment to all who properly appreciate their worth. The value of making a Garden of some description wherever practicable in conjunction with every dwelling house, cannot be overestimated, as it invariably tends to promote health and enjoyment. There is an extremely wide range in its application, admitting unlimited arrangements according to the amount of available space to be inclosed or the requirements and taste of those persons who have to incur the expense of preparing or keeping it up. In large towns, the value of land precludes the possibility of obtaining any more than a limited portion as Garden ground, yet this should be utilised to the fullest extent

Garden—*continued.*

for the purposes to which it is best adapted. The amount of interest and pleasure, apart from profit, to be derived from a Garden, depends greatly on the capacity of the individual who may frequently or occasionally visit it, to notice and appreciate the beauties of nature that may be found in every conceivable form around. These advantages of pleasure, combined with utility in obtaining the crops annually, represent the practical outcome of capital expended on Gardens, and an adequate return should be obtained in an indirect, if not in a pecuniary, manner. Very much depends on the gardener using every available means to render his charge attractive and satisfactory to all concerned, as, without this attention, a Garden becomes the reverse of what it really should be. Much more may be accomplished in a small space, if proper and continued attention is bestowed, than would, at first sight, appear credible. This is frequently exemplified in the case of amateurs, who only have window space or that allowed with a small villa or cottage. The love of a Garden and its products, in every way, is one of the prevailing characteristics of English fashion, from the highest to the lowest class of individuals, and it should receive encouragement on every hand. The more a student of nature learns of the various forms and means adopted therein for reaching certain ends, every one of which has some definite purpose, the more is he induced to pursue his investigations, although the gaining of further knowledge only reveals the marvellous extent of the system open for study to those who choose to proceed with it. The form and extent of Gardens depending so entirely on that of the house or mansion with which they are associated, renders it impossible to give more than general advice regarding their position or method of laying out to the best advantage. Some of the principal points to be adopted, and others which it is well to avoid, will be duly noticed, both in the case of Gardens of considerable extent, and also in those of smaller dimensions.

FRUIT AND KITCHEN GARDEN. In planning and laying out this department, on an extensive scale, the exercise of considerable judgment and forethought will be required. It is work that only falls to the lot of comparatively few gardeners in the first instance, yet a knowledge of its performance is frequently requisite to enable alterations to be made with part at a time, that in due course may, in some respects, convert the whole. The most important points to be observed are situation, soil, form, size, and shelter.

Situation and Soil. A situation has sometimes to be accepted irrespective of the condition or quality of the soil, but each requires an equal notice wherever there is a choice. In selecting a site, it should be, if possible, slightly undulated and face the south, or a little south-east. In dry districts, or where the sub-soil is of a gravelly nature, it would be better if the ground were nearly flat, provided efficient drainage could be secured without having to go very deep at any point. If in connection with a mansion, the best position near to it should be selected for the Kitchen Garden, on account of transferring the produce; yet it should be sufficiently far away to allow work of any description to proceed at the proper time. Many proprietors take a great interest in this department, which generally includes nearly the whole of the forcing operations, grape and other fruit culture under glass, &c. It is advisable that the approach from the mansion should be towards the front or ends of the houses, in preference to the back, which is invariably utilised for tool and other sheds. A southern aspect, or nearly so, being that usually selected for garden structures, and also for the front or principal part of a mansion, it follows that the best position for the Garden is on some point towards the east or west, far enough away to admit of the boundary walls being concealed from view by trees and shrubs, and to allow of the approach being in the direction above indicated. The condition of the soil should be considered in several respects—as to its depth in general, the quality of the top spit, and also the sub-soil. A depth of less than 18in. will be unsuitable, the best being from 2ft. to 3ft. A rather heavy loam in some parts, with that of a lighter or more sandy nature in others, will admit of positions being selected for different crops that require such soils; and, for this reason, both are preferable if to be obtained. The quality of the sub-soil, especially when it is of an irony or close, retentive nature, and so prevents the free passage of air and water, has a great effect on all fruit-trees and on garden crops generally. Fruit-trees seldom succeed on such sub-soils, as, once their roots enter it, canker and other diseases immediately attack the branches and cause them to decay. Much may be accomplished in improving and deepening shallow soils by adding more on the top from an adjoining field or other place; but this causes a great deal of work, and, moreover, does not remove the evils attending a bad sub-soil; consequently, the latter should be avoided, if possible. The amount of drainage to be applied artificially depends a great deal on the porosity of the earth beneath the surface. In many cases, it is only necessary to drain the walks; and if the situation of the garden is undulated, this may be easily effected. Land of a retentive, clayey nature may require draining throughout in districts where the rainfall is heavy, in order to remove the superabundant moisture that would otherwise collect. In other soils, resting mostly on gravel, sufficient is generally conducted naturally by the latter from the majority of growing crops. In selecting a situation for the Kitchen Garden, the available means for supplying water must also be considered, as a large quantity is always required in summer. If it can be procured from a stream or large open reservoir exposed to sun and air, it will be found warmer, softer, and better suited in every way for plants, than if obtained direct from a well or spring. A stream passes through some Gardens, and although the water is very useful at times, its presence in spring attracts the least frost, which often proves destructive to fruit blossom and other early crops. If a natural source, higher than the garden itself, is not available, another method may be employed, such as a hydraulic ram, for forcing water into a reservoir at a point sufficiently high to insure its return through pipes to any part of the Garden desired. The above conditions are not always to be obtained, but they should be fully considered wherever there is a choice of site.

Form and Size. Where, as in this case, the cultivation of fruit and vegetables is of first importance, the shape of the ground does not matter materially. This and the size are points depending a good deal on each other, and on the requirements of each place individually. An extensive Kitchen Garden, of some five or six acres of land, has often to be managed for cultivating sufficient fruit and vegetables to supply the demands of a large household. As the expense of laying out a Garden of this size, and the subsequent annual expenditure to keep it stocked, and in good order, are necessarily heavy, the greatest care should be taken, in the first instance, to utilise every means for rendering the whole a permanent success. The size, number of walls, glass structures, &c., must, therefore, entirely depend on requirements and the amount of expense to be incurred. The Kitchen Garden, or a large portion of it, is usually surrounded with walls. These are essential for the cultivation of fruit-trees that would not succeed and ripen crops in the open ground, and they are best placed so as to form either a square or an oblong, with its ends running towards east and west. Such shapes

Garden—*continued.*

admit of the division and arrangement of the inclosure being carried out in a uniform manner, the latter allowing a much larger surface of wall exposed to a southern aspect than the former—an important consideration in many localities, as the borders share the same advantage. Whether the walls should be direct north and south, or facing a little to one side, is a matter on which opinions differ. If set on an angle from the south, they should certainly face a little in an easterly direction, to obtain the full benefit of the sun's rays before midday. Fruit-trees, suitable for all aspects, may be selected so as to cover both sides if desired. Thus, the walls having a southern aspect, should accommodate Peaches, Nectarines, Apricots, and some of the best Pears; the eastern would do for Plums and good hardier Pears that are too tender for succeeding in the open; the western for more Plums and Cherries, also for Apricots in some localities; and the northern for Morello Cherries, late Gooseberries and Currants. In northerly or extreme cold districts, some of the first-named of these trees require a glass covering as well. The proper levels for every main point will be one of the first conditions to be fixed in laying out, and this, on a large scale, will necessitate the use of instruments that are seldom kept by gardeners. Such main points should be decided so as to insure a means of drainage and other necessaries before any of the positions for the walls are fixed, and they should be disposed so that the intermediate spaces may be regulated from them, and the whole work proceed on a definite system thus arranged at the outset. Generally, three or four main walks, intersected with others at right angles, are sufficient for any walled-in Kitchen Garden, the quarters thus formed being sub-divided, for convenience, with paths cut in the ground. The fruit-tree borders should be at least 10ft. or 12ft. wide, and the outer main walk should follow their limit at that distance from the wall. Trained fruit-trees are usually placed parallel with the main walks, sufficiently far back to form the boundary for other borders that should preferably be utilised for growing Roses and hardy flowers for cutting, or for some crop such as a salad. In many Gardens, a range of forcing houses throughout a good portion of the length is thought desirable, and they usually present a fine appearance if built on a plan and of a size proportionate with the surroundings. In most instances, it is, however, advisable to place the glass structures by themselves, just sufficiently far apart to admit of all equally sharing a full amount of sunshine and light. This allows of all being more conveniently connected with a heating apparatus without having recourse to an unnecessary number of boilers. Additional space will usually be required for fruit culture beyond that inside the Garden walls, and an adjoining site should be selected, if suitable, and included within the boundary fence. The soil, subsoil, draining, &c., will need similar attention to be bestowed as in the interior or any other part of the Garden where such trees are planted. Where a good orchard is at command for the supply of Apples, &c., a material advantage is gained in the Garden, by an extra amount of land being available for vegetable culture. It is always best to allow crops plenty of room to develop themselves, as the soil in the intermediate spaces may be more easily cleaned, and the produce will invariably be of a superior quality.

Shelter. An important requisite in connection with the site selected for a Kitchen or Fruit Garden, is shelter. The most destructive winds are those from the East and North-east to North-west. If natural shelter from these quarters can be procured at the outset, so much the better; but otherwise, a screen must be prepared in some way, to neutralise the force of the wind, and to render its effect on tender vegetation less dangerous. This is most effectually provided by planting a double avenue of trees, or forming a wide plantation, so as to include trees or shrubs that are of a quick-growing nature, and are known to succeed in the locality. Scotch Firs, *Pinus austriaca*, *P. Laricio*, and several others of this family, Poplars, Larches, Elms, &c., may be freely used where they are known to succeed. Garden walls, 10ft. or 12ft. high, afford some shelter to the part inclosed; but the evil effects of cold, cutting winds have always to be guarded against, not only for the sake of outside plants, but also for those in forcing or other warm structures. South-west winds are frequently very rough and destructive. It is also advisable to provide a shelter from these, but it should be further away, so as to avoid excluding sun and light. High trees of any description are not desirable near the southern exposure. Those recommended for planting on the northern and eastern sides may commence at a distance of about thirty yards from the Garden boundary.

FLOWER GARDEN AND PLEASURE GROUND. By these terms reference is made to departments entirely devoted to the cultivation of flowers, shrubs, and trees of an ornamental character, selected and arranged with the natural scenery, &c., around, to form a place of resort for interest and pleasure at all times. A Flower Garden is considered an indispensable adjunct to every residence; combined with Pleasure Grounds, it has a more extensive significance as applying to that adjoining or surrounding a mansion. It must, of necessity, be within easy access, so that the most attractive parts may be seen from the windows, or reached in a short time from the outside. The embellishment of Flower Garden beds, and the continued attention required to keep all in good order throughout the year, most seriously affect the other departments where the numberless plants have to be prepared, especially if carpet-bedding is introduced. Where the means at command for storing and growing these plants are totally inadequate for supplying enough to properly fill the space, it would be better to reduce the number of beds, or to devote some of them to select hardy perennials, than to attempt too much with an insufficiency of material, and so destroy the effect of the whole. This is a matter requiring attention when first planning and laying out a Flower Garden. The extent of Pleasure Grounds may be as much as desired, or according as the woods surrounding the mansion will admit. They are frequently made to form a connection between this latter and some other building or permanent place of interest, such as the Kitchen Garden. Apart from the natural scenery and the free use of ornamental trees and shrubs, the introduction of many hardy flowering plants may be recommended, as suitable positions for their development may, perhaps, be better found here than in the Flower Garden proper. The various tastes possessed by proprietors or their friends, with the size of the establishment and the extent to which gardening may be carried, will each have an effect on individual cases, and prevent the following remarks from being more than those of a general character. It is well, if possible, to avoid extremes in the matter of taste, as there is plenty of room for all styles, if restricted to places in which they are appropriate.

Site and Extent. Most of the mansions built some two or three centuries ago are situated in a valley or the lower part of an extensive park. A somewhat elevated position is now invariably chosen, as the great importance of fresh air has become more fully recognised. Extended views of landscape are usually selected for the front or principal outlook; and as these already exist, and, perhaps, form part of the design in fixing the site for the building, neither of them should be selected for the Flower Garden, if another place in the vicinity can be obtained without interfering with that which exhibits natural beauty in itself. An open expanse

Garden—*continued.*

of lawn, with a few clumps of shrubs and trees of limited growth, judiciously placed, would be more appropriate in close proximity to the building from which the view is desired, and would not be likely to detract attention, as would a mass of flowers, from the main object of view beyond. Where such landscape effects do not exist, one of the best positions may be chosen for the Flower Garden—supposing there is sufficient shelter, as the advantage of being able to view it from the windows in any weather, must not be overlooked. Some of the best-arranged and most compact Flower Gardens are those laid out on grass, in an inclosure of which a large conservatory forms part of the boundary, the other part being composed of trees of an ornamental character that afford good shelter, and do not exclude too much light. Shelter is most important in the selection of a site, as the tender exotics used in summer, especially in carpet and sub-tropical beds, will not succeed if too much exposed. Bedding plants present but a poor appearance when allowed to suffer from drought in summer; hence the necessity of an abundance of water. This may, in many instances, be obtained from that supplying the mansion, by means of pipes laid underground, and furnished with screw sockets, wherever desired, for connecting a standpipe and hose. Carrying water by hand is an almost hopeless task in a large establishment in summer.

Preparation of Ground, Flower Beds, &c. Soil which is heavy and retentive is unsuited for a Flower Garden; but at times there is no choice, and the best modes of ameliorating and warming it must be adopted. The first necessary means for attaining this end is thorough drainage, not only for the good of the shrubs and flowers, but also for the whole of the land and walks. The state of the latter has much to do with the general appearance of the Garden, and, if undrained, it is impossible to pass over them with pleasure during or immediately after rain. A gravelly sub-soil will usually drain the lawn and open land sufficiently without pipes, especially if the position is a little elevated; but where the whole is of a clayey nature, and of a good depth, it may be necessary to lay them at distances not exceeding 12ft. apart. The work of laying main drains, and the branches connected therewith, should be a preliminary operation, performed as soon as the various points and levels are fixed, and before the plan of the beds is finally laid out. All tender bedding plants require a rather light, moderately rich soil, to encourage them to root and grow freely so soon as they are planted. If that secured naturally to form new beds be heavy or retentive, it should be dug out about 1½ft. deep, and either partially or entirely replaced with some of a lighter description. Leaf soil is the best of all manures to use, as it tends to encourage rapid root action, without, as a rule, causing an undue growth at the top. In soils already light, an addition of something heavier in the way of loam would be advisable, otherwise leaf mould may be used in quantity. It should be thoroughly incorporated by digging, or part of the plants will outgrow the others. A flower bed prepared for planting should be firm and raked rather fine, and should present a uniform nearly flat surface, about 1in. higher than the edge of the bed, from which it should be clearly separated.

Style and Mode of Laying Out. Various styles of laying out are employed: they may be practically included under two headings—the geometrical, and the free or symmetrical. The former is essentially formal and is largely employed, as being most suitable, for inclosed Gardens surrounded with everything more or less of a formal character. It admits of colours being arranged so that the proportion is evenly balanced when viewed as a whole; one-half of any correct geometrical design being intended as an exact counterpart of the other. The free, or symmetrical, style allows, according as individual taste may suggest, a much wider scope in the shape and arrangement of the beds and their mode of embellishment. This plan, properly executed, is preferred

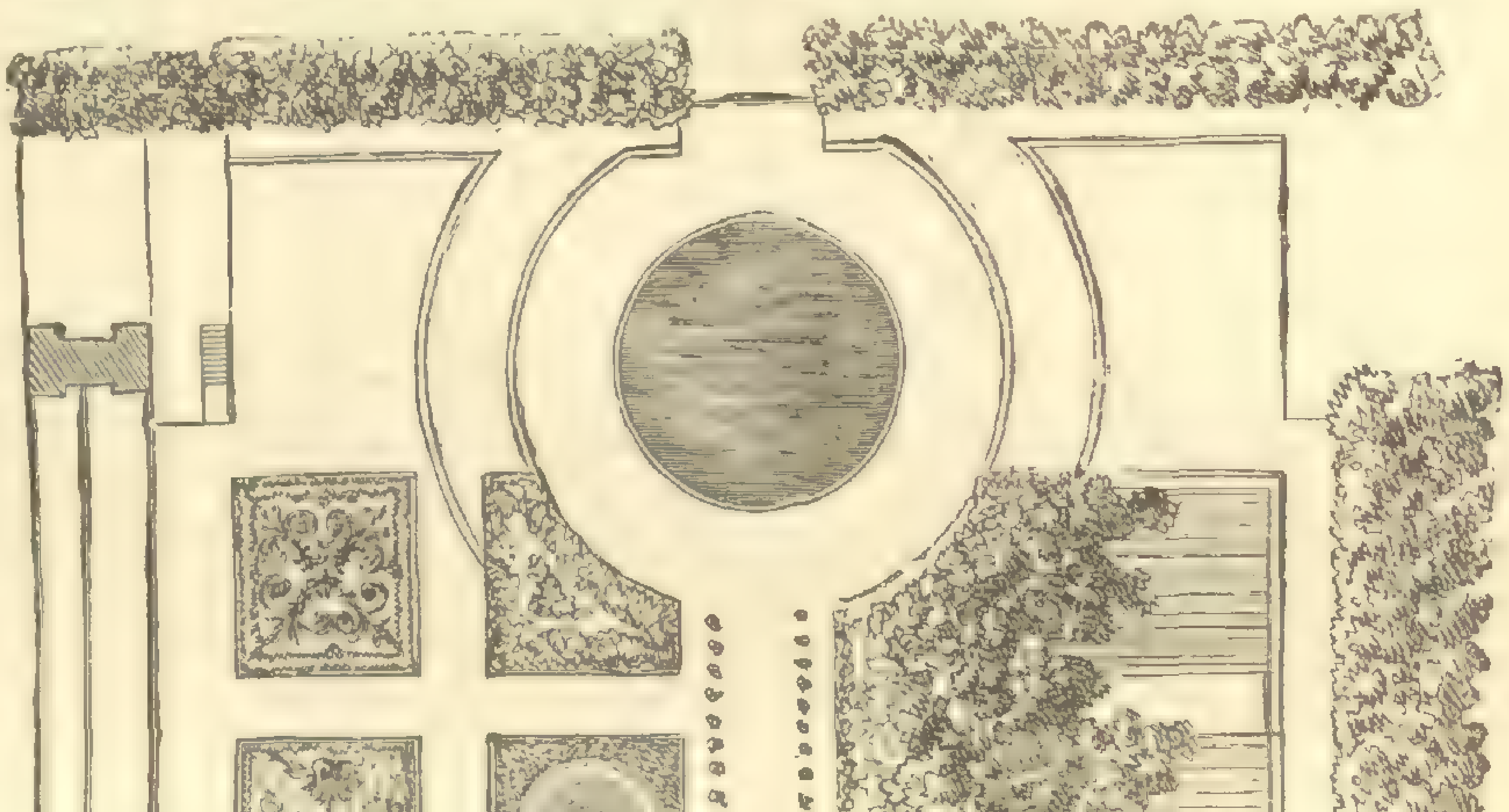


FIG. 75. GROUND-PLAN OF THE TUILERIES GARDEN (TIME OF LOUIS XIII.).

by many, as it dispenses, in great part, with the formality of the other; yet, to be attractive, symmetry must, to a certain extent, be assured both with the beds and their occupants. The surrounding scenery must also be appropriate, and should form the main guide in disposing of the space at command. Although it is scarcely possible to have an excess of flowers, when placed in their proper positions throughout an extended area, yet too much is frequently attempted in Gardens of limited proportions, with the disadvantage that the plants employed are unable to exhibit their true characters. Simple figures, as beds cut out in the turf, in a size proportionate to the surroundings, are invariably most satisfactory, in Gardens of either large or small pretensions, where the

Garden—*continued.*

symmetrical style is adopted. Geometrical designs may also be cut in grass, although some prefer Box or other edgings. Figure gardening was for a long time greatly in vogue; the various scrolls were represented by different shrubs and coloured gravels, the numerous narrow walks between being also gravelled. The ground-plan of the Garden of the Tuileries in the time of Louis XIII. (see Fig. 75) may be interesting as indicating the extent to which the system was carried out in France. Its existence in this country is now almost entirely limited to Gardens of historic interest, the general use of turf having become more prevalent, with the result that a great improvement has been effected in the majority of instances, as the plants and flowers were previously subordinate to the edgings and walks surrounding them.

The method of laying out will be the next proceeding, after the points already noticed are decided, and the preliminary work of draining, levelling, &c., is accomplished. The design on paper, if to be accurately represented on the ground, should be prepared to a scale that may be easily divided, and the enlargement calculated. A Garden, in the shape of a square or parallelogram, of any size, may be more readily laid out than one with an irregular outline. The necessary tools will be a tape measure and measuring rod, a strong line, and some pegs. A right-angled triangle, a pair of wooden compasses, and a large T-square, are also useful instruments. A system of exactly gauging and marking everything, must be adopted where there are many figures to be shown in relation to each other. The outside boundary should be measured out into equal distances of one or more feet, according as it may be practicable to divide the plan; and if these points are marked with pegs, and the positions of all the walks similarly fixed, a foundation will be formed that will facilitate the means of obtaining the other references required. Where there are several walks, it would be advisable to mark all the corners, and insert a few pegs to define their boundaries on both sides. If it is necessary that a main walk should proceed at considerable length, quite straight, an ordinary line is not a certain guide. Upright stakes, about 6ft. high, specially prepared and painted white, with a broad band of black or red near the top, are most useful. When the two ends are fixed by having a stick driven in at each, the intervening space may be accurately marked by others from the sight obtained from either end. If a long curve or sweep is to be laid out, the ends must first be known, and, if possible, a few points between. This may also be marked by similar stakes; but one side is usually obtained by laying a rather heavy line with the hand, and afterwards measuring the width from it for the other. Gardens vary so much in size, shape, and other respects, that it would be impossible to give advice applicable to all alike. The foregoing remarks refer to some of the principles adopted in laying out the Flower Garden or walks in the Pleasure Ground, but other methods may be necessary in instances where these cannot be applied. The Pleasure Ground, as a rule, has only one main walk, sometimes formed of gravel, and at others of a broad expanse of turf. The principal recommendation for gravel is that, if properly laid, it may be walked on in weather and seasons when turf would not be dry enough. In forming Pleasure Grounds, much may be done with trees and shrubs that not unfrequently exist beforehand, by arranging and grouping others, so as to more fully exhibit the true character of those growing in a natural state. Avenues, glades, and vistas, with an irregular outline running into the surrounding woods, terminating with some specimen tree or other object in the distance, and clumps of massive Rhododendrons, placed far enough from the walk to show their beauty when in flower: these should be some of the leading characteristics. The planting of conifers and other ornamental trees should be restricted

Garden—*continued.*

to such as are known to succeed in the locality, as climate and soil greatly affect them everywhere. The permanent positions for these should be selected, so that plenty of room is allowed them to develop, and nothing of interest eventually hidden in consequence. A group of conifers, planted wide enough apart to avoid overcrowding, and surrounded by an open lawn, always has a more striking appearance than when the same number are placed about singly over an extended area.

American Garden. This title signifies an open space in the Pleasure Ground, or some other part of the Flower Garden, wherein a collection of chiefly American plants, or those whose progenitors came from that country, are grown. Many of the most beautiful of hardy flowering shrubs are included amongst these, and others, of a hard-wooded nature, that are usually cultivated and thrive under similar conditions. The Rhododendron and hardy Azalea are shrubs largely grown, and both are now represented in endless and beautiful varieties. Heaths in variety, Ledums, Kalmias, Gaultherias, and many others of a like character, all help to constitute a collection of interesting shrubby plants that cannot fail to be admired. They require a light peaty soil, and will not succeed if chalk is present, or if the drainage be defective. For plants of this description, the usual and necessary plan, where the natural soil is heavy, is to specially prepare beds with peat and leaf soil, which, on the other hand, need not be of a great depth where the sub-soil is light and porous, as none of them are of a deep-rooting nature.

Sub-tropical Garden. Where means are at command, sub-tropical gardening should be adopted in summer so far as the number of plants and suitable situations admit. It is imperative that the latter should be well sheltered from rough winds, as these soon destroy the fine foliage of the plants used. If a suitable site can be obtained in the Flower Garden, it is preferable, as forming a contrast to the ordinary flowering subjects used in the other beds. Large plants, such as some of the hardier palms, tree ferns, Musas, &c., in pots or tubs, present a fine appearance when plunged outside; but these require considerably more room to keep them in winter than can be allowed in any except very extensive places. Many other plants are, however, available that may be raised from seed or cuttings each spring, and these form, in suitable situations, a commendable addition. They require a deep rich soil and more light than palms, &c., which make but little growth outside. Sub-tropical plants, such as *Acacia lophantha*, Cannas, *Eucalyptus globulus*, *Grevillea robusta*, *Melianthus major*, Ricinus in variety, Solanums and Wigandias, with many others, are all of easy culture, and are very effective on account of their varied and attractive foliage.

Hardy Perennial Garden. After a long season of comparative neglect, the large and very important class of herbaceous and other hardy perennial plants once cultivated are again assuming their proper position in many Gardens, by having an extensive border or other space specially devoted to their accommodation. An open situation and a rich soil are preferred by the majority. Shelter, afforded by trees or by other means, is advisable, supposing the former are not near enough to overhang and cause shade, or for their roots to impoverish the ground. Many of the choicest alpine plants require partial shade and thorough drainage. These succeed best in positions such as the nooks and corners of rockwork; consequently, the latter is a useful and oftentimes requisite addition. Herbaceous plants are not unfrequently disliked on account of the appearance nearly always presented by some of the tops dying away. There are, however, always others to form a succession and prolong the flowering season; and it must be remembered that the decaying tops should only be partially removed, as they form the natural protection for the roots in winter. Sufficient interest should be developed

Garden—*continued.*

in hardy plants for the general beauty and floral display presented by such a large proportion of their number, to completely ignore an objection like this. The Perennial Garden or mixed border should be of considerable width, to admit of tall-growing subjects being included; and if a background can be obtained of high Rhododendrons, or other evergreens that shelter without causing too much shade, the cultivated plants will be benefited, and, when in flower, will be seen to the best advantage. In Fig. 76 is represented a summer view of an existing garden, a little less than an acre in extent, devoted chiefly to the cultivation of hardy perennial and alpine plants. Sufficient space is here found

FIG. 76. HARDY PERENNIAL AND ALPINE GARDEN.

for upwards of 2000 species and varieties, and all succeed more or less under unfavourable atmospheric conditions.

Rock Garden. Where numerous hardy alpine and herbaceous plants are cultivated, a Rock Garden, greater or less in extent, is the most suitable place for their accommodation. Many of the best and rarest species will not succeed so well elsewhere as they do amongst the crevices on an elevated piece of rockwork, which, in addition, affords a situation for an endless variety of hardy and half-hardy plants. There are few Gardens in which something of the sort might not be constructed and rendered attractive, especially in localities where stones are plentiful. After being once planted, the requisite care in after treatment is but nominal,

Garden—*continued.*

compared with the additional interest thereby secured, particularly when only a select class of plants is allowed, and these are appropriately placed, according to their height or special cultural requirements. Attempts are sometimes made, in a Rock Garden of an extensive description, to imitate, so far as practicable, the work of Nature in the arrangement of the stones employed. This has often to be conducted partially at the expense of providing adequate means for the well-being of the plants, which should be the main consideration. Where space and material are unlimited, excellent results may be attained; but in a confined area, the effect produced in many cases only shows the insignificance of the work in comparison with that of Nature. Rockwork may be introduced for various reasons, apart from the culture of alpines, such as hiding an unsightly wall or other objects of limited height, or for giving a diversity to an otherwise flat and uninteresting scene. A Rock Garden may be successfully formed where the surface is generally flat, by digging a deep cutting of an irregular outline through a piece of ground, and utilising the soil thus obtained as mounds of uneven heights along the upper part on either side, whereon trees and evergreen shrubs may be planted as a background and for affording shelter. The stones should be arranged to form cavities of an irregular size and shape, for the accommodation of various plants, from the sides of a walk made in the centre of the cutting, up the gradual slope formed by the soil, until the shrubs in the background are reached. It does not so much matter what the quality of the soil is underneath, providing it is porous enough to insure drainage, as additional new soil should be given each plant when inserting it. Formality must be avoided as much as possible in the arrangement, and the stones should be deeply embedded, in order to hold them firmly. Various aspects are desirable to suit different plants, and these should be readily secured in a Rock Garden by the irregular shape the latter should assume in construction. Artificial masses of rockwork, for ornamental effect, are sometimes introduced into the slopes of hills adjoining a mansion; and, if properly executed, they present quite a natural and fine appearance. The extent of, and position for, a Rock Garden must depend on the surroundings, and on the amount of space and number of plants at command. If arranged on a mound in the open, the slope should be very gradual; and a good proportion of shrubs should be introduced near the top. Dwarf-growing shrubs, Yuccas, and other subjects of an evergreen character, are always acceptable for their attractiveness in winter when the primary alpine and herbaceous occupants are resting. Care should be taken not to over-fill the cavities with soil, so as to bury the stones; and the surface of each, when planting, should be left somewhat flat, in order that rain and other water may enter the ground instead of running off. Considerable experience is necessary for the proper construction of a Rock Garden on a large scale, and a knowledge of the various habits of hardy plants is requisite before their positions for planting can be appropriately fixed. A quantity of loam and leaf soil, with some small pieces of granite or other stone, should be mixed beforehand, and a portion placed round each plant, the addition of peat being made in the case of those requiring it. Rockeries usually improve in appearance with age, and when the plants have had time to develop and fill their allotted space. Other plants may be continually introduced, and improvements effected, where the arrangement of those first selected proves in any degree unsatisfactory. Annual top-dressings of new soil should be given to such as do not appear to succeed; and a plentiful supply of water in summer is requisite, almost without exception, for all.

Wild Garden. Of recent years, the naturalisation

Garden—*continued.*

of hardy plants has received more than usual attention by the formation of Wild Gardens, wherein they may grow and produce an effect by an artificial arrangement something like the appearance presented by them

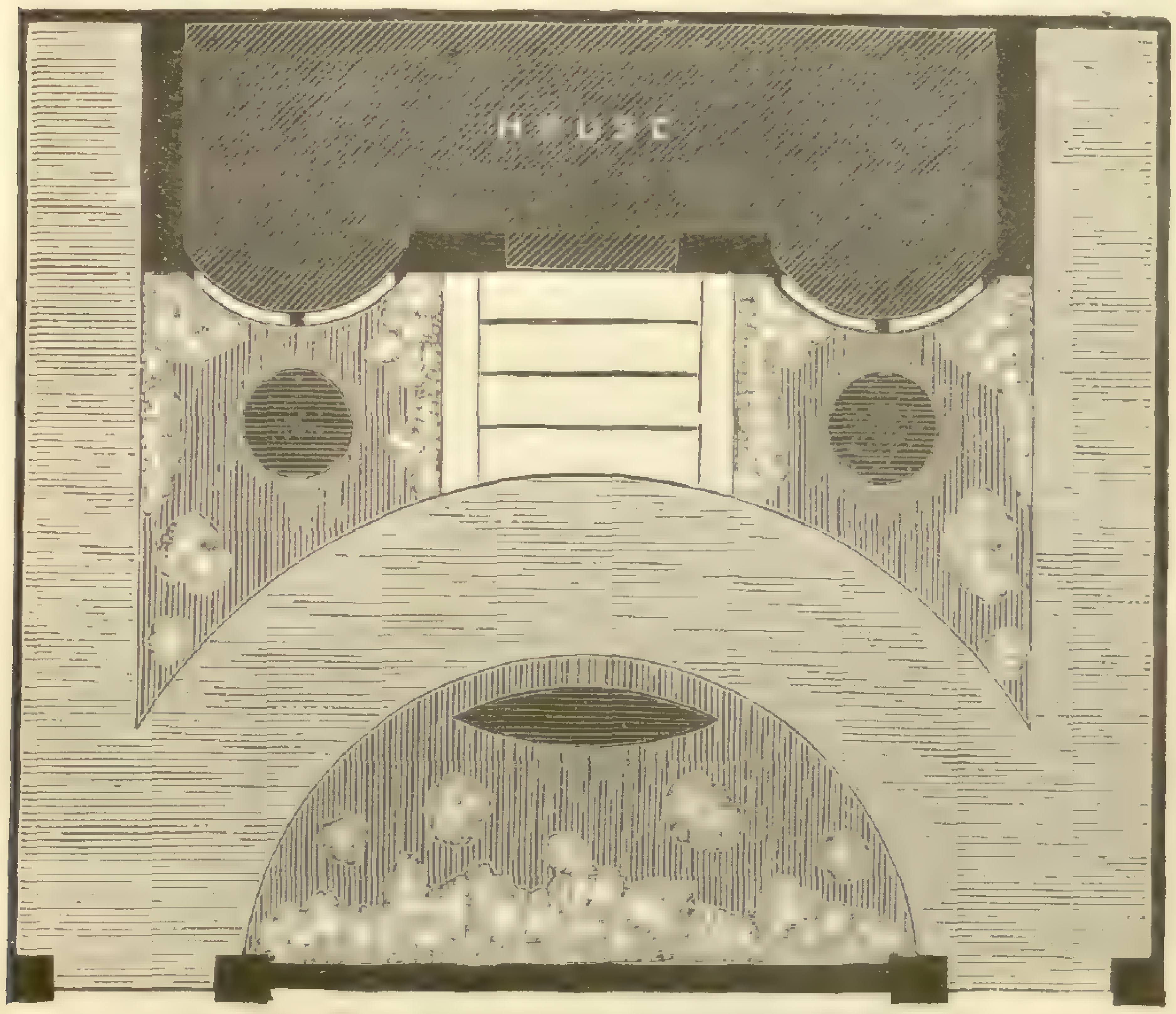


FIG. 77. PLAN OF DETACHED VILLA GARDEN (FRONT CARRIAGE ENTRANCE).

in a natural state. The spot selected for a Wild Garden should be possessed of some natural attraction adapted to artificial improvement; otherwise, the attempt to imitate Nature will be but a poor one. Various strong-growing perennials that cannot be afforded space to

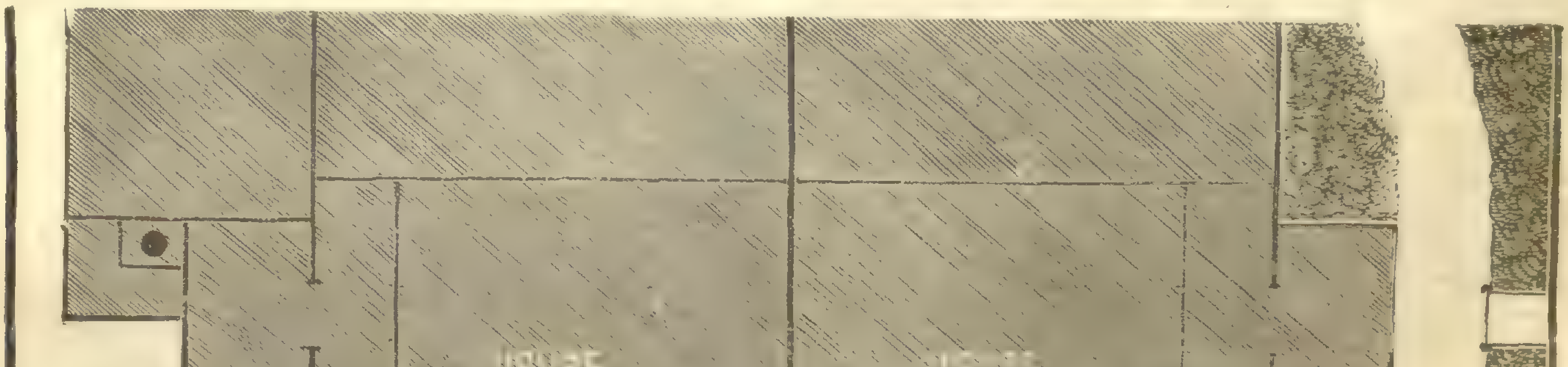


FIG. 78. PLAN OF SEMI-DETACHED VILLA GARDENS (FRONT ENTRANCES).

develop in the mixed border or rockery, form the best of subjects to arrange in the Wild Garden, which, in country districts, cannot be better situated than in a part of the Pleasure Ground more or less surrounded with woods. Many of the beautiful bulbous plants that may be secured in quantity, succeed admirably under trees; and, when flowering above the grass, in spring, in large groups, they present a charming appearance. Narcissi in great variety, common Hyacinths, Primroses, hardy Cyclamens, various Liliums, Snowdrops, and numerous other subjects of a similar nature, are well suited for naturalising in masses. Tall-growing plants, such as Asters, Foxgloves, Polygonums, strong-growing Roses, and others, in endless variety, may be similarly treated where there is sufficient room for their full development. The Wild Garden, as its name indicates, should be specially set apart as a place for the cultivation of hardy plants that grow freely, and where they may be allowed to do so at will with only very limited restriction.

Rose Garden. The popularity of Roses, and their general beauty in summer, demand special attention in the matter of cultivation, which cannot be better secured than by specially selecting a position for the purpose, and arranging the different sections, as dwarf, standard, climbing, or pillar plants, to form a garden exclusively for Roses. A piece of ground should be set apart in every large establishment for this purpose, and if the habits of the various sorts are studied and due notice given in the respective positions selected for them, a floral effect may be obtained, and a greater or less quantity of flowers gathered for four or five months in the year. For further information and culture, *see* **Roses.**

VILLA GARDENS. Villas most largely preponderate in the suburbs of cities and extensive commercial centres or towns, and are built either as detached or semi-detached residences, with an adjoining Garden, that must necessarily be of a limited character. Detached villas are usually situated at or near one end of their own grounds a small space at the front being devoted

Garden—*continued.*

to lawn and shrubs, with or without a carriage drive to the door, and the back part also laid out in lawn, with the addition of as many shrubberies and flower beds as may be thought desirable; the space beyond this being utilised for a Kitchen Garden, if there is sufficient [illegible]. Semi-detached residences are frequently limited to a piece of land not much exceeding half the size of that allotted to those entirely isolated, and are at a further disadvantage of each being overlooked from the neighbouring side. It frequently happens that these Gardens are laid out by the builder after his operations are finished, and the incoming tenant has, perhaps, only a short lease, which naturally prevents him going to the expense of extensive alterations to suit personal requirements for a very limited time. It cannot be expected that anything elaborate can be obtained in such a limited space as that connected with a villa; yet it is surprising what an amount of interest and pleasure may be derived from such, if care and judgment are exercised—first in laying out, and afterwards in the selection of suitable subjects for filling the space at command. Flower beds are recommended, so far as circumstances admit, particularly those of a mixed character, where the permanent occupants may be select hardy perennial and alpine plants, various spring flowering bulbs, &c.; and the intervening spaces filled, in summer, with annuals and various tender bedding subjects. A position should always be found for Roses, as they are indispensable in every Garden. The selection of shrubs should be restricted to such as are known to be limited in growth, and suitable for their positions, when required for the lawn or for a border below the front windows. When it is necessary to plant trees near flower beds, for a screen, considerable injury must, of necessity, be caused by the roots impoverishing the soil and by the tops frequently overhanging and so causing too much shade. One of the greatest faults in any Garden is overcrowding. This should be a point especially avoided with those adjoining villas, where the owners, in their laudable endeavour to grow as many things as possible, are often advised to try what is quite beyond their means to successfully accomplish. Laying out, replanting, the care of plants, &c., grown in the greenhouse or frames, with the ordinary general attention requisite for all, should always be entrusted to someone competent to advise and undertake it, in preference to employing another whose services may be procured at a cheaper rate. Just sufficient trees, of limited growth, should be planted to insure privacy at all times; a certain portion of the inclosure, according as circumstances admit, being devoted to the cultivation of a few good shrubs and flowers, and the rest laid in turf, i.e., supposing the whole is arranged for pleasure only. This is generally the intention with villa Gardens, in which a space is allowed, perhaps not exceeding 6yds., from the house to the front boundary, and another, about 25yds. long, at the back, the width being that of the building and its side entrance. A greenhouse is always interesting when adjoining a villa, if the plants therein are such as do well, and are properly tended—a condition, perhaps, not practicable with all, but one that is insufficiently studied where means are at command. Far more pleasure is derived from a few floriferous plants well grown, than from a quantity that merely exist, and are unduly crowded. Villa Gardens depend so much on the plan adopted with the building and with others adjoining it, also on the taste and resources of the proprietor or tenant, that definite advice cannot be given so as to be applicable to all. With a view to assist amateurs in the arrangement or laying out of their gardens permanently, both in the front and back parts of their residences, some illustrations are given with a view to suggestions being taken therefrom. In Fig. 77 is represented the front entrance to a detached villa by a semi-circular carriage drive. The object is to screen the door from view outside by a thick shrubbery, and to have circular flower beds cut in the turf on each side of the steps; a larger one of another shape, also for flowers, such as dwarf Roses, being situated in the front, on the opposite side of the drive. Front gardens connected with two semi-detached villas are shown in Fig. 78. That on the left (*a*) is laid out in a formal style, a large flower bed surrounded with a gravel walk. The bed might be planted geometrically,

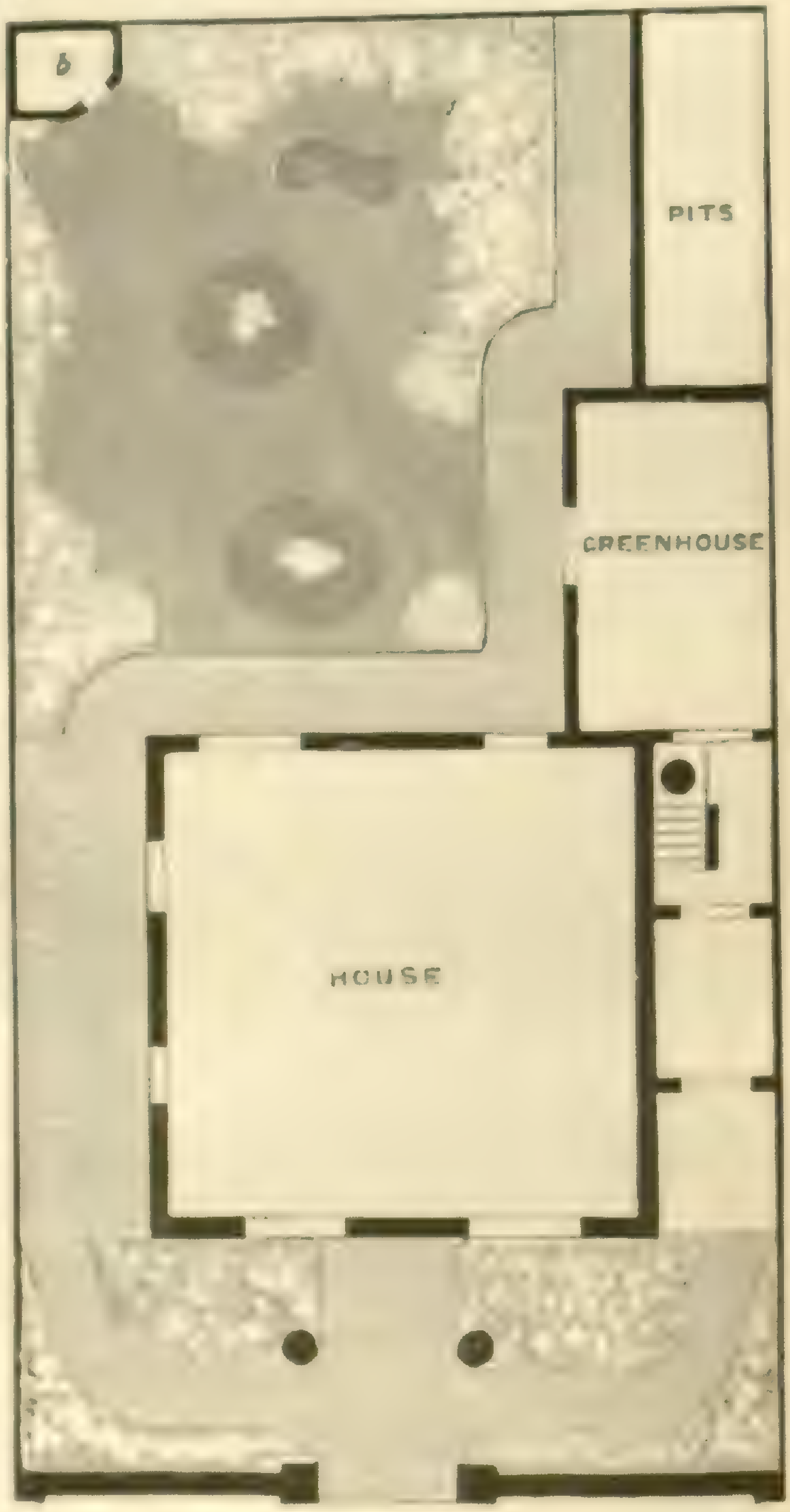


FIG. 79. PLAN OF DETACHED VILLA AND GARDEN.

as shown, or in any way desired. The other (*b*) has a narrow border of shrubs under the window, which is continued round as far as the entrance gate. The space between is intended for turf, with a few small beds cut in it for flowers or some dwarf shrubs. This style is much to be preferred to the preceding one. A plan of a detached residence situated inside its grounds is represented in Fig. 79. This shows a greenhouse and pits attached to the building, the lawn having flower beds in it, and nearly surrounded with a dwarf shrubbery. The object here

Garden—*continued.*

is to get the best view from a summer house in the corner (*b*), and from the windows of the principal rooms. The plan shown at Fig. 80 is one that might be adopted on a rather large and expensive scale for a Garden connected with a good-sized villa. The outside boundary is usually a wall, and in this case it is intended to be hidden by a row of dwarf Robinias and an irregular belt of shrubs. These

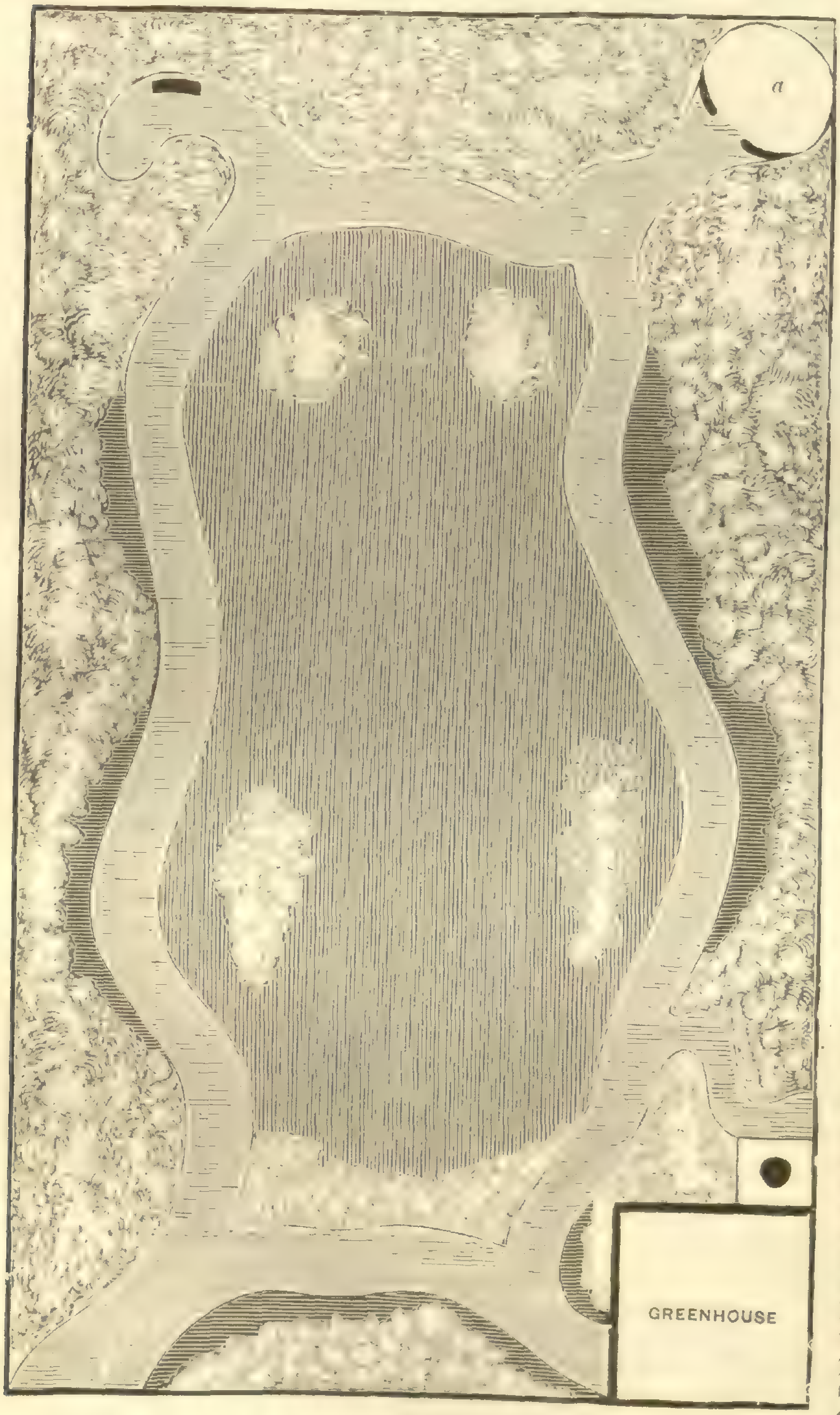


FIG. 80. PLAN FOR VILLA GARDEN.

are followed by turf and a walk of an irregular outline, which ends in a rustic summer house at one corner (*a*) and has a garden seat at another. A greenhouse joins the residence, which is not shown in the figure; and the lawn, situated in the middle, has a few clumps of evergreen flowering shrubs arranged in the corners and curves formed by the walks. Considerable expense would be incurred in stocking and properly keeping up a Garden of this description; but it would not require to be frequently renewed, like a quantity of summer flower beds.

GARDEN CRESS. *See* **Cress, Garden.**

GARDENER'S GARTER. *See* **Phalaris arundinacea variegata.**

GARDEN FRAMES. *See* **Frames, Garden.**

GARDENIA (named in honour of Alexander Garden, M.D., of Charlestown, Carolina, one of the correspondents of Ellis and Linnæus). Including *Rothmannia.* ORD. *Rubiaceæ.* A genus comprising about sixty species of elegant stove or greenhouse evergreen trees or shrubs, indigenous to tropical Asia, as well as the Cape of Good Hope. Flowers white, axillary or terminal, usually solitary, and generally sweet-scented; corolla funnel-shaped or salver-shaped, having the tube much longer than the calyx, and the limb twisted in æstivation, but afterwards spreading. Leaves opposite, rarely whorled. The double forms of *G. florida* and *G. radicans* produce white flowers that are amongst the most beautiful and highly perfumed of any in cultivation. Gardenias are principally grown for the use of the flowers in a cut state, as these are in great demand, and appear so much in a succession as not to render the plants sufficiently attractive by their presence for ordinary decoration, excepting that of the stove. Propagation is readily effected by cuttings. Strong, healthy ones should be selected, preferably with a heel attached, such as those obtained from the points of side shoots, half or fully ripened. Early in January is the best time to propagate for allowing the plants a long season to grow before flowering the next winter; but almost any time in the year will do when suitable cuttings can be secured. They should be inserted singly in small pots of sandy peat, unless required in large quantities, when this plan would demand too much space, and the alternative of placing several in a larger size would have to be adopted. The pots should be plunged in a bottom heat of about 75deg., in an inclosed frame of the propagating house, and allowed to remain there until the cuttings are rooted.

Cultivation. Gardenias are not difficult to cultivate, provided they have plenty of heat and moisture during the growing season, and are kept free from insects. These conditions encourage the production of strong healthy shoots, which, after being ripened, and the plants rested, supply a large quantity of flowers from the points. The young plants, when rooted, should be hardened from the frame to the open house, and potted on by liberal shifts as becomes requisite, in a lumpy compost of two-thirds peat to one of fibry loam, with an addition of some charcoal. Where bottom heat is not at command, a hotbed of fermenting material is frequently made up in a house, for plunging the pots in, the house itself being heated by pipes in the ordinary way. If carefully managed, and not allowed to over-heat, this plan is generally attended with good results. Very large plants may be obtained, under proper treatment, in one season; and if a succession is propagated occasionally to follow others, and thus some are in different stages of growth, the supply of flowers may be considerably prolonged. After the season's growth is completed, a lower temperature and more air should

Gardenia—*continued.*

be given. Some persons prefer planting out Gardenias in a heated structure over hot-water pipes; but cultivating in large pots allows the advantage of being able to shift them for destroying insects and for subjecting them to lower temperatures in other houses. It is not advisable to keep old plants; much better flowers, and a greater quantity, may be obtained from young ones grown rapidly by liberal treatment each, or, at least, every second, year. Almost any amount of water may be applied to the roots in summer, and syringing morning and evening may be freely practised.

Insects. Gardenias, if not well looked after, become more infested with insects than is usual with even the ordinary occupants of warm houses. Mealy Bug is most destructive, collecting in quantities about the points, and crippling the young flowers and leaves. Careful watching for these, from the time cuttings are inserted, must be constantly kept up, and measures taken to insure their eradication if found. A wineglassful of petroleum to a three-gallon can or open pail of tepid water, thoroughly mixed, by having a syringe filled two or three times, and its contents returned into the can, previous to being applied, is one of the best insecticides. The plants should be laid on their sides, if in pots, the operation performed in dull weather, and the petroleum thoroughly removed by clean water half an hour later. This may be practised occasionally as a preventative. Green Fly is readily destroyed by fumigation; Red Spider may be kept down considerably by syringing; and if Scale should be troublesome, they must be removed by sponging. All these infest Gardenias at some time, if the least chance is given; consequently, a watch must be kept, and measures applied, as preventatives to their becoming established.

G. amœna (pleasing). *fl.* white, having the lobes purple on the outside in that part which is exposed to the air, while the corolla is in æstivation, almost terminal, solitary, sessile; tube greenish, long, terete. June. *l.* oval, acute, glabrous, on short petioles; spines axillary, short, straight. *h.* 3ft. to 5ft. China. Stove. (B. M. 1904.)

G. florida (flowery).* Cape Jessamine. *fl.* white, sweet-scented, solitary, almost terminal, sessile, salver-shaped, nine-parted. August. *l.* elliptic, acute at both ends. *h.* 2ft. to 6ft. China, 1754. Plant shrubby, unarmed, erect. Stove. (B. M. 3349.) Of this species, there are several varieties, and that usually grown as *florida* is but a double-flowered variety (B. M. 2627).

G. f. Fortunei (Fortune's).* *fl.* white, large, pure, fragrant. July. *l.* opposite, or in whorls, bright shining green. China. Apparently a very large form of the typical species. (B. R. 32, 43.)

G. f. variegata (variegated). This is much the same as the type, but has leaves beautifully margined with yellowish-white. A handsome form.

Gardenia—*continued.*

G. nitida (shining).* *fl.* white, terminal, solitary; calyx six-parted; corolla with a narrow tube and a seven-parted, reflexed limb. October and November. *l.* opposite or tern, oblong-lanceolate, undulated. *h.* 3ft. Sierra Leone, 1844. Stove. (B. M. 4343.)

G. radicans (rooting). *fl.* white, solitary, almost terminal, and nearly sessile, salver-shaped, very fragrant. June. *l.* lanceolate. Stems radicant. *h.* 1ft. to 2ft. Japan, 1804. Plant shrubby, unarmed. Greenhouse. (B. M. 1842.)

G. r. major (larger).* This is one of the most profuse flowering forms; it is larger in all its parts than the type, but smaller than *G. florida.*

G. r. variegata (variegated). *l.* margined with white. Japan. An interesting and elegant form. See Fig. 81.

G. Rothmannia (Rothmann's). *fl.* yellow, purple; sepals subulate, rounded; tube smooth, dilated, short. July. *l.* oblong; stipules subulate. *h.* 10ft. Cape of Good Hope, 1774. Greenhouse. (B. M. 690.)

G. Stanleyana. *See* **Randia maculata.**

FIG. 82. GARDENIA THUNBERGIA, showing Habit and detached Single Flower.

G. Thunbergia (Thunbergia).* *fl.* white, large, fragrant, terminal, solitary, sessile, eight-parted. January to March. *l.* elliptic, acute, glabrous, opposite, or three or four in a whorl. *h.* 4ft. to 5ft. Central and Southern Africa, 1774. Plant shrubby, unarmed. Greenhouse. See Fig. 82. (B. M. 1004.)

GARDEN PINK. *See* **Dianthus plumarius.**

GARDOQUIA (named in honour of Don Diego Gardoqui, a Spanish financier of the eighteenth century, who promoted the publication of a Flora of Peru). SYN. *Rizoa.* ORD. *Labiatæ.* A genus comprising about twenty-six species of greenhouse or half-hardy subshrubby evergreens, natives, for the most part, of Chili and Peru. Calyx tubular, thirteen-nerved; corolla with a long, almost straight tube, its upper lip notched, the lower in three lobes, the middle one of which is broadest. Leaves small, numerous, entire, rarely largely dentate. Gardoquias thrive in a compost of loam, peat, and sand. Propagation is effected by cuttings, made of half-ripened shoots, and inserted in sand, under a bell glass. When rooted, the young plants should be potted off in small pots, and grown near the glass, in a greenhouse, and, as they advance in size, shifted into larger-sized pots.

G. betonicoides (Betony-like) is **Cedronella mexicana** (which *see*). See Fig. 85. (B. M. 3860.)

G. breviflora (short-flowered). *fl.* secund, in whorls; calyx a little coloured, with lanceolate-acute

FIG. 81. SHOOT OF GARDENIA RADICANS VARIEGATA.

Gardoquia—*continued.*

teeth, and with the throat naked inside. *l.* on short petioles, roundish-ovate, obtuse, with scarcely revolute margins; floral leaves similar to the rest. Peru. This species is scarcely distinct from the genus *Micromeria*, in consequence of the corolla hardly exceeding the calyx.

FIG. 83. CEDRONELLA MEXICANA (GARDOQUIA BETONICOIDES), showing Habit and Single Whorl of Flowers.

G. Gilliesii (Gillies'). *fl.*, corolla scarlet, pubescent; calyx elongated, erect, with lanceolate, subulate, nearly equal teeth; throat naked inside. June. *l.* oblong-linear, or cuneated, obtuse, quite entire, narrowed at the base, green on both surfaces, flat; floral leaves similar to the others. Valparaiso, 1820. Plant procumbent. (B. R. 1812.)

G. multiflora (many-flowered). *fl.* in loose whorls, sub-secund; cymes pedunculate, scarcely dichotomous; corolla scarlet or purple, more than 1in. long. April. *l.* petiolate, ovate, bluntish, crenated a little, rounded at the base, green, pale beneath. Stems hard at the base, but scarcely woody. *h.* 1ft. Chili. (B. M. 3772.)

GARIDELLA. Now included under **Nigella** (which *see*).

GARLAND FLOWER. A common name for *Hedychium.* It is also applied to *Daphne Cneorum* and *Pleurandra Cneorum.*

GARLIC (*Allium sativum*). This perennial has been extensively cultivated in Europe, Asia, and North Africa, from remote antiquity. It has become naturalised in Sicily, the South of France, and most of the South of

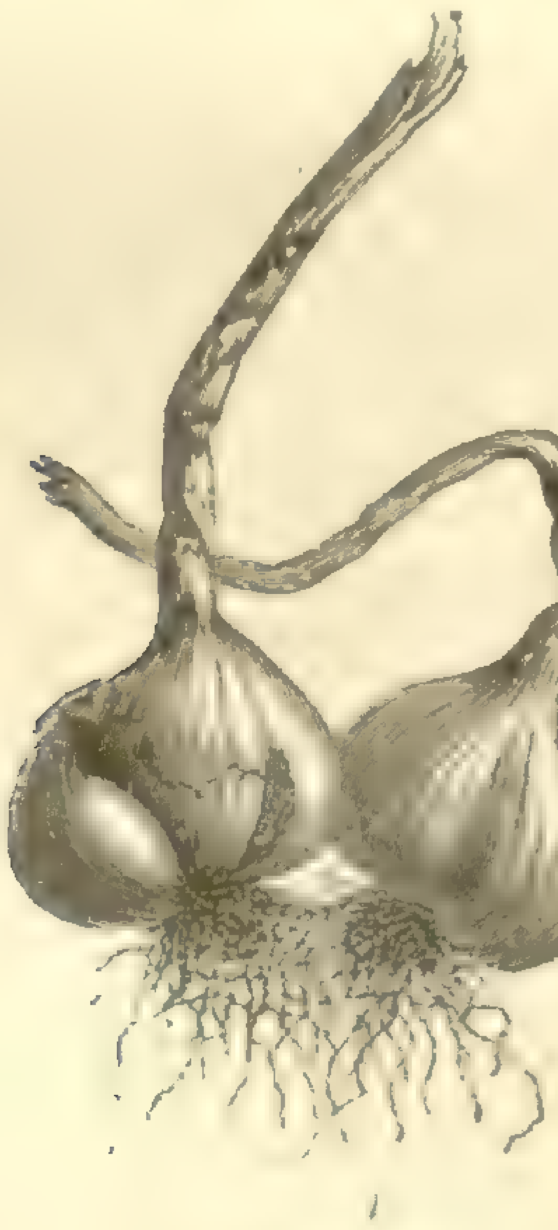


FIG. 84. GARLIC.

Europe, being found growing in meadows, pastures, and waste places. According to De Candolle, the only country in which it is known to be undoubtedly wild is the Kirghis Desert. Garlic has been cultivated in this country

Garlic—*continued.*

since 1548. At one time, it held a place in most of the early pharmacopœias; but, like many other of our vegetable medicines, has fallen into disuse. In Britain, it is employed as a culinary ingredient; but, on account of its extremely penetrating and diffusive odour, it is seldom served up in a solid state. Garlic is easily propagated by seeds, which should be sown in the open ground, in March; or by dividing the cloves of the bulbs (see Fig. 84) into as many parts as they admit, to form separate plants. A light soil, and rather dry position in the kitchen garden, suit them best, planting the cloves early in March, about 9in. asunder, in drills 1ft. apart, and covering with 2in. of soil. An occasional hoeing, to destroy weeds, will be all that is necessary for the after treatment, until the tops die, when the roots should be lifted and dried in the sun. A few may be planted in autumn for an early supply, only a small quantity being usually required at one time in private gardens.

GARLIC PEAR. *See* **Cratæva.**

GARRYA (named in honour of Michael Garry, of the Hudson's Bay Company). Including *Fadyenia.* TRIBE *Garryaceæ* of ORD. *Cornaceæ.* A genus consisting of about eight species of ornamental hardy ever-

FIG. 85. FLOWERING TWIG OF MALE PLANT OF GARRYA ELLIPTICA.

green shrubs, of which seven are found in California and Mexico, and one in Cuba and Jamaica. Flowers, male and female on different plants, arranged in elegant pendulous catkins, proceeding from near the apex of

Garrya—*continued.*

the shoots, and often from 4in. to 9in. long. Leaves opposite, petiolate, entire or denticulate, penninerved. *G. elliptica* is the only species in general cultivation. It forms an elegant bush plant for the shrubbery border in the South of England, but is, perhaps, seen to the greatest advantage when grown against a wall or trellis. Propagated by seeds; or by cuttings of half-ripened wood, inserted in sandy loam, in August, and shaded from strong light until rooted.

G. elliptica (elliptical).* *fl.* greenish-white or yellowish. Spring. Berries black. *l.* elliptical, dark green and shining above, hoary beneath. *h.* 8ft. to 10ft. California, 1818. See Fig. 85.

G. Fadyenii (M'Fadyen's). *male flowers*, spikes branched, pendulous; sepals cohering at apex. *female flowers*, spikes simple, erect; style short, thick. Spring. *l.* elliptic, shortly apiculate. Jamaica.

G. Fremonti (Fremont's). *fl.* resembling those of *G. elliptica*, but catkins shorter and less decidedly pendulous. *l.* oblong or obovate, acute, slightly wavy at the margins. North-west America. (G. C. 1881, xv. 431.)

G. macrophylla (large-leaved). *fl.* green; racemes short, disposed in terminal, dense, few-flowered panicles. Spring. *l.* ovate-elliptic, 4in. long, 2½in. broad. *h.* 6ft. Mexico, 1846.

FIG. 86. BRANCH OF GARRYA THURETI.

G. Thureti (Thuret's). A garden hybrid, intermediate in general characters between its two parents, *G. Fadyenii* and *G. elliptica*, the first being the seed-bearer. It was raised in the Paris Botanic Garden about 1862. See Fig. 86. (R. H. 1879, 154.)

GARRYACEÆ. A tribe of *Cornaceæ*.

GARUGA (native name). ORD. *Burseraceæ*. A genus of about eight or ten species of ornamental stove evergreen trees, natives of tropical Asia and America, with one from Australia. Flowers yellowish. Leaves imparipinnate; leaflets almost sessile, crenate. The species here described is the one most generally met with in cultivation. For culture, *see* **Boswellia.**

G. pinnata (pinnate). *l.* somewhat villous; leaflets oblong, lanceolate, bluntly crenate. Drupe globose, fleshy, with a rough austere taste. *h.* 60ft. East Indies, 1808. A deciduous tree, with soft, spongy wood.

GASTERIA (from *gaster*, a belly; referring to the swollen base of the flowers). ORD. *Liliaceæ*. A genus of about fifty species of greenhouse evergreen succulents, closely allied to *Aloe*, natives of the Cape of Good Hope. Flowers racemose or panicled; pedicels red; bracts small, persistent; peduncles naked. Leaves usually rosulate, thick, fleshy, generally tongue-shaped or ensiform. Under cultivation in this country, the flowering season of all the Gasterias is during the winter months. For culture, *see* **Aloe.**

G. acinacifolia (scimitar-leaved). *fl.* orange. March to September. *l.* distichous, scimitar-shaped, with cartilaginous prickly edges. 1819. (B. M. 2369, under name of *Aloe acinacifolia.*)

G. brevifolia (short-leaved).* *fl.* red, nearly 1in. long; raceme 1ft. long; peduncles 1ft. long, simple or forked. July. *l.* ten to twelve, close together, lingulate, 3in. to 4in. long; apex bluntly cuspidate; dirty green, with numerous small white spots. Stems leafy. Previous to 1809.

G. carinata (keeled).* *fl.* 1in. long; raceme 1ft. long; peduncles simple, 1½ft. long. *l.* fifteen to twenty, dense, outer ones spreading, inner ones ascending; all lanceolate, 5in. to 6in. long; face concave; back distinctly keeled; apex deltoid-cuspidate. Stem leafy. 1731.

G. Croucheri (Croucher's).* *fl.* numerous, pendulous, 2in. long; perianth tubular, cylindric, contracted in the middle, upper part white, with green veins, lower pale rose-colour; racemes numerous, 8in. to 10in. long, curving upwards; scape 2ft. to 2½ft. high. August. *l.* numerous, spreading, recurved, 1ft. long, 3in. to 3½in. broad at base, ¾in. to 1in. thick, dark green, spotted with white; margins toothed. *h.* 2ft. Origin unknown. (B. M. 5812, under name of *Aloe Croucheri.*)

G. disticha (two-ranked).* *fl.* scarlet, nearly 1in. long; racemes 1ft. or more in length; peduncles the same, simple or branched. *l.* ten to twelve, distichous, dense, patent, 4in. to 6in. long, 1½in. broad; face flat, with small obscure green spots on both surfaces. Stem leafy. 1820. There are several varieties of this species.

G. glabra (glabrous). *fl.* 1in. long; racemes 1ft. or more long, forty to fifty-flowered; peduncle simple, 6in. long. *l.* fifteen to eighteen, dense, outer ones recurved, inner ones erecto-patent, lanceolate, 6in. to 9in. long; face concave, shining green, both surfaces with small white spots; apex deltoid-cuspidate. Stem leafy. 1796. (B. M. 1331, under name of *Aloe carinata.*)

G. maculata (spotted).* *fl.* scarlet, ¾in. long; raceme 1ft. long; peduncles 1ft. or more long, simple or branched. *l.* sixteen to twenty, distichous, loosely disposed, erecto-patent, bright shining green or purple, 4in. to 6in. long, with large white bright spots in profusion; base dilated, rose-colour. Stem leafy, 6in. to 9in. 1759. (B. M. 979, under name of *Aloe Lingua.*)

G. nigricans (blackish). *fl.* nearly 1in. long; raceme 1ft. to 1½ft. long; peduncle stout, 1ft. or more long, always simple. *l.* twelve to twenty, distichous, dense, tongue-shaped, coriaceous, 4in. to 8in. long; face swollen below, flat above, shining, dark or purple-green, with copious small white spots. Stem leafy, 2in. to 3in. 1790. (B. M. 838, under name of *Aloe Lingua crassifolia.*)

G. nitida (shining). *fl.* 1in. long; raceme 1ft. to 1½ft. long; peduncle 1ft. or more long, simple. *l.* twelve to fifteen, dense, outer ones spreading, inner ones spreading, all lanceolate, 8in. to 9in. long, bright green; face concave; back oblique, keeled, with copious small white spots on both surfaces. Stem leafy, 1½in. to 2in. 1790. (B. M. 2304, under name of *Aloe nitida.*) The variety *grandipunctata* has larger spots.

G. pulchra (fair).* *fl.* scarlet, ¾in. long; raceme 1ft. long; peduncles 1ft. or more long, branched. *l.* sixteen to twenty, distichous, loosely disposed, all ascending, sometimes 1ft. long; face concave, with large bright green or purplish spots on each surface. Stem leafy, 6in. or more high. 1759. (B. M. 765, under name of *Aloe maculata.*)

G. variolosa (variegated). *fl.*, inflorescence and perianth agreeing with *G. maculata*. *l.* fifteen to eighteen, in a congested, sessile, spirally distichous rosette, ligulate-lanceolate; the edge white and horny in the upper half, slightly eroded; the surfaces smooth, dull green, densely spotted with copious, immersed, small oblong whitish-green blotches. *h.* 1ft. 1860. (Ref. B. 347.)

G. verrucosa (warty).* *fl.* 1in. long; racemes four to eight, disposed in a deltoid panicle, terminal, 6in. long; peduncles 6in. long. *l.* ten to twelve, distichous, close, ensiform, outer ones patent, inner ones alone ascending, 6in. to 9in. long; face concave; apex sub-pungent; back swollen. Stem leafy, 1in. to 2in. 1731. (B. M. 837, under name of *Aloe verrucosa.*)

GASTONIA (named in honour of Gaston de Bourbon, 1608 to 1660, natural son of Henri IV. of France). ORD. *Araliaceæ*. A stove evergreen shrub, allied to **Aralia** (which *see* for culture).

G. cutispongia (spongy-barked). Bois d'Éponge. *fl.*, panicles 1ft. long; umbels at end of crowded erecto-patent branches; petals, stamens, styles, and cells of ovary, each ten to twelve.

Gastonia—*continued.*

l. at the tops of the branches, impari-pinnate; leaflets six to eight, coriaceous, ovate, obtuse, quite entire. Mauritius. A tall, smooth tree, covered with spongy bark. This plant is now referred to the genus *Polyscias.*

GASTRODIA (from *gaster*, a belly; referring to the swelling of the column in front). ORD. *Orchideæ.* A genus of about seven species of tall, slender, leafless, whitish or brown terrestrial orchids, found in Australia, New Zealand, and the Indian Islands. For culture, *see* **Pogonia.**

G. Cunninghamii (Cunningham's). *fl.* dirty green, spotted with white; bracts short, scarious; claw of lip winged; blade linear-oblong, membranous, waved, with two thick ridges down the middle; column very short. Stem 1ft. to 2ft. high; root sometimes 18in. long, very stout. SYN. *G. sesamoides.*

G. sesamoides (Sesamum-like). A synonym of *G. Cunninghamii.*

GASTROLOBIUM (from *gaster*, the belly, and *lobos*, a pod; in reference to the pods being inflated). ORD. *Leguminosæ.* A genus, containing thirty-two species of greenhouse evergreens, limited to Western Australia. It is closely allied, on the one hand, to the strophiolate species of *Oxylobium*, only differing from them in the number of ovules, constantly two; and, on the other, to *Pultenæa*, from which it is distinguished by the habit, the coriaceous leaves, the bracteoles either deciduous or inconspicuous, and the more coriaceous turgid pod. Flowers yellow, or the keel and base of the standard purple-red, in terminal or axillary racemes, either loose or contracted into corymbs or whorl-like clusters; bracts and bracteoles usually very deciduous. Leaves on very short petioles, more or less distinctly verticillate or opposite, simple and entire, usually rigid; stipules setaceous, rarely wanting. For culture, *see* **Pultenæa.**

G. bilobum (two-lobed).* *fl.* numerous, in very short, almost umbel-like terminal racemes. March to May. *l.* mostly verticillate, in threes or fours, from obovate to narrow-oblong, thinly coriaceous, glabrous and veined above, pale and often minutely silky pubescent underneath. 1839. A tall shrub. (B. M. 2212; B. R. 411; L. B. C. 70.)

G. calycinum (large-calyxed).* *fl.*, racemes terminal or in the upper axils; bracts larger and more membranous than in any other species. *l.* opposite or in threes, oblong-elliptical, or more frequently from ovate-lanceolate to lanceolate, with a pungent point, coriaceous, rigid, reticulate, and often glaucous. An erect shrub.

G. emarginatum (emarginate). A synonym of *G. velutinum.*

G. trilobum (three-lobed). *fl.* few, in loose axillary racemes, not usually exceeding the leaves. *l.* rhomboidal or three-lobed, sometimes lanceolate, sometimes very broad and short, very coriaceous, often glaucous, the fine reticulations scarcely prominent. A much-branched, quite glabrous species.

G. velutinum (velvety). *fl.* orange-red, in terminal, rather dense racemes; bracts ovate, very deciduous. April. *l.* verticillate in threes or fours, from obovate or obcordate to linear-cuneate, very obtuse or truncate, emarginate; margins recurved, coriaceous, reticulate, glabrous above, usually pubescent underneath. Branches rather stout, angular, minutely silky pubescent. An elegant species. SYN. *G. emarginatum.*

GASTRONEMA. A synonym of **Cyrtanthus** (which *see*).

GATHERING. *See* **Fruit Gathering.**

GAUB, or GAB. Indian names for the astringent fruits of *Diospyros Embryopteris.*

GAUDICHAUDIA (named in honour of Charles Gaudichaud, who accompanied Freycinet as naturalist in his voyage round the world, 1817-20). ORD. *Malpighiaceæ.* A genus comprising twelve species of graceful, mostly twining stove shrubs, inhabitants of Mexico, New Grenada, and Venezuela. The species of this genus, like those of some other genera of the same family, are remarkable for constantly producing two kinds of flowers. Flowers yellow; petals sometimes perigynous, roundish, spreading. In the more imperfect flowers, the petals are either rudimentary or altogether absent. Leaves opposite, entire. The species given below is the one in general cultivation. For culture, *see* **Galphimia.**

Gaudichaudia—*continued.*

G. cynanchoides (Cynanchum-like). *fl.* yellow, in axillary or terminal crowded racemes. *l.* stalked. *h.* 10ft. Mexico, 1824.

GAULTHERIA (named in honour of Gaulthier, a physician and botanist of Canada). Aromatic Winter-

FIG. 87. FLOWERING BRANCH OF GAULTHERIA PROCUMBENS (CREEPING WINTERGREEN).

green. SYN. *Gualtheria.* ORD. *Ericaceæ.* A genus comprising about ninety species of very ornamental hardy or greenhouse small trees or shrubs, inhabitants of the

FIG. 88. GAULTHERIA SHALLON.

Gaultheria—*continued.*

American continent. A few are found in Asia, five or six occur in Tasmania and New Zealand, and one is Japanese. Flowers white, pink, or red, axillary and terminal, racemose, rarely solitary; corolla urceolate or campanulate, five-lobed; lobes spreading or recurved, imbricated. Leaves coriaceous, persistent, alternate, rarely opposite, often serrate or serrulate, penninerved. The hardy species thrive in a peat soil, and are readily increased by division or by layers. The greenhouse kinds should be treated like other greenhouse shrubs. The species enumerated below are those best known to cultivation. *G. procumbens* does well in the ordinary peat border; and *G. Shallon* is well adapted for growing on rockwork, or as edgings.

G. antipoda (antipodal).* *fl.* white or pink, small, axillary and solitary, or crowded towards the ends of the branchlets. *l.* very coriaceous, veined, shortly petioled, orbicular, oblong-lanceolate or linear-lanceolate, acute, obtuse, or acuminate. *h.* 6ft. New Zealand, 1820. Greenhouse.

G. ferruginea (rusty-coloured).* *fl.* pink; racemes bracteate, erect, rising from the axils at the tops of the branches, the whole forming a panicle. June. *l.* ovate, acute, shining above, with serrulately scabrous margins, clothed with rusty tomentum beneath, as well as the racemes and flowers. A dwarf shrub, or small tree. Brazil, 1852. Greenhouse. (B. M. 4697.)

G. fragrantissima (very fragrant).* *fl.* secund, drooping, shortly pedicelled; racemes axillary, strict, erect, or inclined, shorter than the leaves, many-flowered, pubescent; corolla white or pale pink, mouth small; lobes rounded. April. *l.* very variable in shape, elliptic, ovate, obovate, or lanceolate, acute or acuminate. Branches stout, obtusely angled, shining. Himalayas, 1869. A handsome greenhouse plant (quite hardy in some parts of Ireland). (B. M. 5984.)

G. procumbens (procumbent).* Canada Tea; Creeping Wintergreen. *fl.* white, few, terminal, nutant, solitary. July. Berries red, edible. *l.* obovate, acute at the base, finely and ciliately toothed. Stems procumbent; branches erect, naked at bottom, but with crowded leaves at top. North America, 1762. Hardy. See Fig. 87. (B. M. 1966.)

G. scabra (scabrous). *fl.*, racemes axillary, simple; calyx and bracts clothed with glandular hairs. Summer. *l.* ovate-cordate, acute, toothed, scabrous, reticulately veined beneath. Caraccas. Greenhouse.

G. Shallon (Salal).* *fl.*, corolla white, tinged with red, downy, urceolate, with a closed limb; racemes secund, bracteate, downy. May. Berries purple, globose, acute, fleshy. *l.* ovate, subcordate, serrate, glabrous on both surfaces. North-west America, 1826. Plant procumbent, hairy. The berries of this hardy species have a very agreeable flavour, and make excellent tarts. See Fig. 88. (B. M. 2843; B. R. 1411.)

GAURA (from *gauros*, superb; in reference to the elegance of the flowers of some of the species). ORD. *Onagrarieæ.* A genus comprising about twenty species of hardy annual or perennial herbs, rarely shrubs, natives of the warmer parts of North America. Flowers in terminal, spiral racemes. Leaves alternate, simple. But few of the species are now to be found in cultivation. A light soil suits Gauras best, and they can only be propagated by seed, which should be sown early in spring, in the open ground. As soon as the seedlings are large enough to handle, they should be transferred to their flowering quarters, and a slight covering afforded them during severe weather.

G. biennis (biennial). *fl.* irregular; petals at first white, then reddish, obovate, ascending, spreading, naked; sepals purple at the apex. August to October. *l.* lanceolate-oblong, acute, denticulated. *h.* 4ft. to 6ft. 1762. (B. M. 389.)

G. Lindheimeri (Lindheimer's).* *fl.* rose-white, produced in numerous elegant spikes throughout the summer. *h.* 4ft. Texas, 1850. Annual or perennial. An elegant slender branching species for masses or mixed borders. See Fig. 89. (L. & P. F. G. 3, 127.)

G. parviflora (small-flowered). *fl.* yellow, minute, crowded; spikes elongated. August. *l.* oblong, acuminated, remotely denticulated, and ciliated on the margins, rather velvety when young. *h.* 1ft. to 1½ft. 1835. Annual. (B. M. 3506.)

GAUSSIA (a commemorative name). ORD. *Palmeæ.* A genus of two or three species of ornamental, medium-sized, unarmed palms, with pinnatisect leaves, from the West Indian Islands. They are nearly allied to **Chamædorea** (which *see* for culture). *G. Ghiesbreghtii* (SYNS. *Chamædorea Ghiesbreghtii* and *Oreodoxa ventricosa*) and *G. princeps* are in cultivation in this country.

GAYLUSSACIA (named in honour of N. F. Gay-Lussac, a celebrated French chemist, 1778-1850). SYN. *Lussacia.* ORD. *Vacciniaceæ.* A genus of about forty species of very ornamental, but little grown, greenhouse or half-hardy evergreen or deciduous shrubs, natives of tropical America. Flowers white or scarlet, small, disposed in few or many-flowered axillary racemes. Leaves alternate, persistent, rarely membranaceous, and deciduous, entire or serrate, terminated by a hard spine. For culture, *see* **Vaccinium.**

G. dumosa (low). *fl.* white to rose-red; corolla bell-shaped; bracts leaf-like, as long as the pedicels; racemes elongated. June. *fr.* black. *l.* deciduous, entire, obovate-oblong, mucronate, green on both sides, rather thick and shining when old. *h.* 1ft. to 5ft. North America, 1774. (B. M. 1106, under name of *Vaccinium dumosum.*)

G. frondosa (leafy).* *fl.* greenish-purple; corolla globular, bell-shaped; bracts deciduous, shorter than the slender drooping pedicels; racemes slender, loose. May and June. *fr.* dark blue, with a white bloom, sweet and edible. *l.* deciduous, entire, obovate-oblong, blunt, pale, glaucous beneath. Branches slender and divergent. *h.* 3ft. to 6ft. North America, 1761. (A. B. R. 140, under name of *Vaccinium frondosum.*)

G. pseudo-vaccinium (false Vaccinium). *fl.* crimson; racemes axillary, erect, secund, bracteate. May. *l.* elliptic-lanceolate, obsoletely serrated towards the top. *h.* 1ft. to 2ft. Brazil, 1843. Greenhouse. SYN. *Vaccinium brasiliensis.*

G. resinosa (resinous).* *fl.* reddish; corolla ovoid-conical, or at length cylindrical, with an open mouth; bracts and bractlets small and deciduous; racemes short, clustered, one-sided; pedicels as long as the flowers. May and June. *fr.* black, without bloom, pleasant (very rarely white). *l.* deciduous, entire, oval, oblong-ovate, or oblong, thickly clothed and (as well as the flowers) at first clammy with resinous globules. *h.* 1ft. to 3ft. North America (in woodlands and swamps), 1782. (B. M. 1288, under name of *Vaccinium resinosum.*)

FIG. 89. FLOWERING BRANCH OF GAURA LINDHEIMERI.

GAZANIA (named in honour of Theodore Gaza, 1393-1478, a learned Greek translator of the botanical works of Theophrastus into Latin). SYNS. *Mœhnia* and *Mussinia*. ORD. *Compositæ*. A genus comprising twenty-four species of very showy plants, natives of the Cape of Good Hope. Flower-heads large and handsome, with yellow strap-shaped ray-florets and tubular disk-florets, usually of a darker colour. Leaves alternate or radical, entire or pinnatisect. Gazanias are of easy culture, in a cool greenhouse, or in the open border, in summer. A compost of loam and peat is most suitable. Propagation is rapidly effected, in July or August, by cuttings, made from the side shoots near the base of the plant; these should be inserted in sandy soil, and in a close frame.

G. Pavonia (peacock).* *fl.-heads* large, handsome; ray-florets with brown spot at the base, or white central dot, and a green tinge. July. *l.* pinnatifid, hairy. *h.* 1½ft. 1864. A very handsome plant. (B. R. 35.)

G. rigens (stiff). *fl.-heads* brilliant golden colour, with an interior black velvet band. June. *l.* linear, spathulate, hairy. *h.* 1ft. 1755. (B. M. 90.) From this and *G. uniflora*, the several garden varieties have been raised.

G. splendens (splendid).* *fl.-heads* large; ray-florets bright orange, with a black and white spot at the base of each; disk paler. *l.* linear-spathulate, silky, white beneath. *h.* 1½ft. A very handsome and much-grown trailer, of supposed hybrid origin.

G. uniflora (one-flowered).* *fl.-heads* yellow; ray-florets same colour as disk. July and August. *l.* spathulate-lanceolate, downy beneath. Stem shrubby, decumbent. *h.* 1ft. 1816. (B. M. 2270.)

GEAN. The wild Cherry, **Cerasus Avium** (which *see*).

GEASTER. In the southern parts of England, Earth Stars—for so the species of *Geaster* are called—are now and then found in shrubberies. Some of them are extremely sensitive to moisture, and are driven

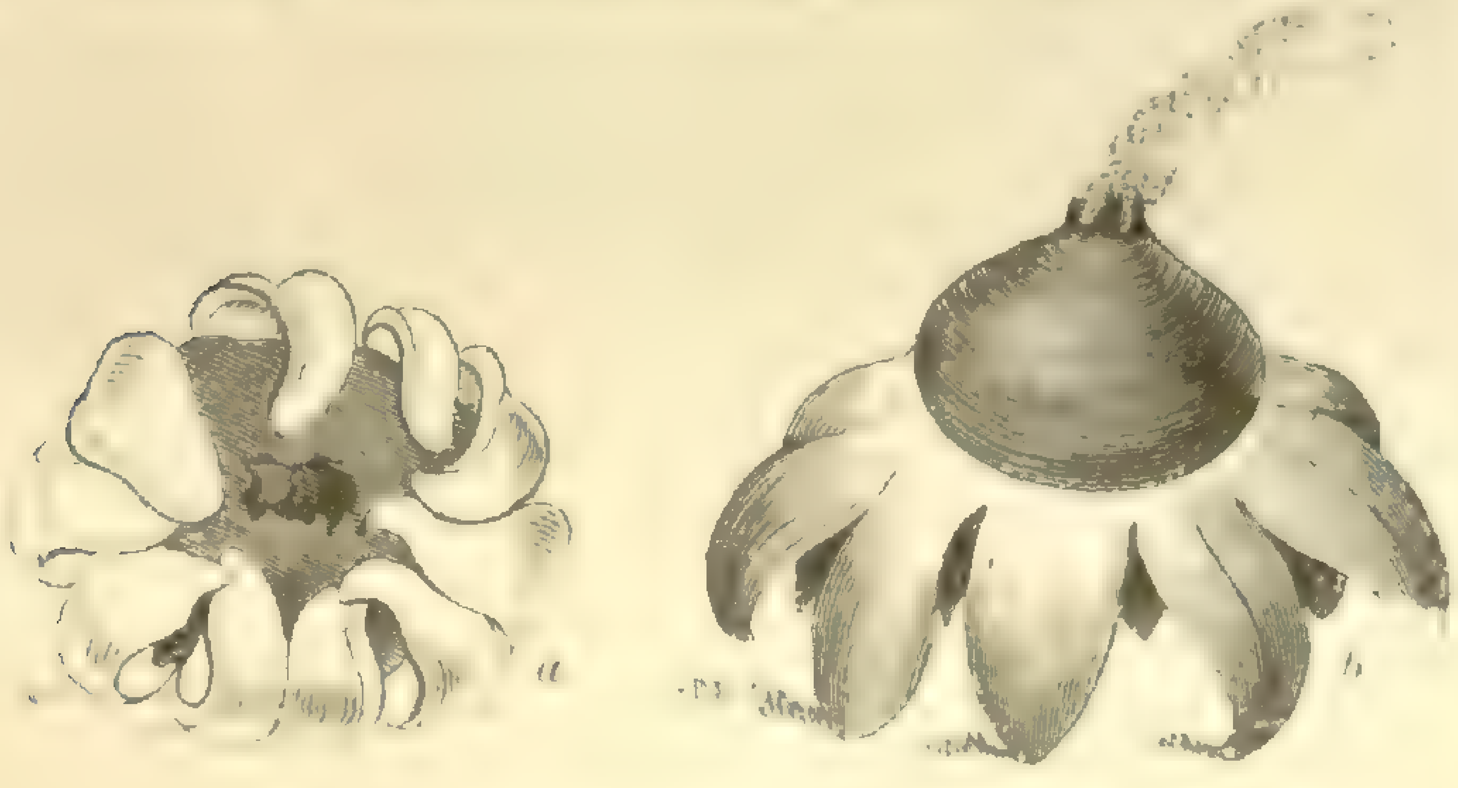


FIG. 90. GEASTER HYGROMETRICUS.

about by the wind as shapeless masses (see Fig. 90, *a*), till the first shower expands them, as in Fig. 90, *b*.

GEBLERA. Included under **Securinega.**

GEERIA. A synonym of **Eurya** (which *see*).

GEISSOIS (from *geisson*, house-tiling; the seeds are imbricated like the tiles on a house). ORD. *Saxifrageæ*. A genus comprising about four species of stove evergreen trees, natives of New Caledonia, the Fiji Islands, and Australia. *G. racemosa*, perhaps the only species yet introduced, is a handsome tree, requiring a very sandy loam, to which a small quantity of peat may be added. Cuttings root if inserted in sand, under a hand glass, in heat.

G. racemosa (racemose). *fl.* crimson; racemes axillary, many-flowered, solitary, or in threes, produced from the old wood. *l.* opposite, petiolate, quinate; leaflets elliptic, obtuse, quite entire; stipules oblong, ribbed, undivided. *h.* 20ft. New Caledonia, 1851.

GEISSOMERIA (from *geisson*, a tile, and *meris*, a part; the imbricated bracts fall over each other like tiles on a roof). SYN. *Salpixantha*. ORD. *Acanthaceæ*. A genus containing about ten species of stove evergreen, pubescent or glabrous shrubs, of which one is from Jamaica and the rest from Brazil or Guiana. Flowers red, often velvety, long, in simple terminal spikes or paniculate racemes; calyx five-parted; corolla tubular, dilated upwards. Leaves oval or oblong, entire. Stems

tetragonal. The plants thrive in a compost of loam and peat, with the addition of sand and a little rotten cow-dung. Cuttings, procured from rather firm shoots, root easily during summer, if inserted in sandy soil, covered with a bell glass, and placed in bottom heat. The species best known to cultivation are those described below.

G. coccinea (scarlet).* *fl.* scarlet, sessile, decussate in loose spikes; peduncles axillary, solitary, pendulous, or terminal by threes. August. *l.* ovate, coriaceous, entire. *h.* 3ft. Jamaica, 1842. (B. M. 4158, under name of *Salpixantha coccinea.*)

G. longiflora (long-flowered). *fl.*, corolla scarlet, tubular, velvety, with an arcuate, clavate, somewhat ventricose tube, which is smooth inside; spikes terminal and axillary. October. *l.* opposite, ovate-lanceolate, wavy, sessile, tapering to the base, smooth above, somewhat pubescent beneath, silky at the veins. *h.* 3ft. Brazil, 1826. A splendid free-flowering plant. (B. R. 1045.)

GEISSORHIZA (from *geisson*, a tile, and *rhiza*, a root; referring to the dry coats which cover the bulbs, like the tiles on a roof). Tile Root. ORD. *Irideæ*. A genus of about twenty-four species of very pretty greenhouse or half-hardy bulbous plants, natives, for the most part, of the Cape of Good Hope. Flowers Ixia-like, variable in colour, very showy; perianth funnel-shaped, with a short tube, and an ample, six-parted, nearly equal limb. Leaves narrow, setaceous, or sword-shaped. Bulbs covered by the scarious remains of the bases of the leaves, which lie over each other like the tiles of a roof, and hence the common name. For culture, *see* **Galaxia.** The following are a selection of the species usually seen in cultivation:

G. excisa (abrupt-leaved). *fl.* white. April and May. *l.*, radical ones ovate-oblong. *h.* 6in. 1789. (B. M. 584, under name of *Ixia excisa.*)

G. grandis (large-flowered).* *fl.* inclined; perianth segments pale straw-coloured, with a blood-red midrib, elliptic-obovate, obtuse, patent; spike six to eight-flowered. May. *l.* radical, linear-ensiform, obtuse, green, strongly ribbed towards the base. Stem stout, leafy throughout. 1868. (B. M. 5877.)

G. inflexa (bending).* *fl.* very large and handsome; perianth petal-like; tube very short, slender at the base; segments of a bright yellow, each marked at the base with an obcordate dark purple or velvet spot. May. *l.* ensiform, acute, falcate, or obliquely bent. *h.* 1½ft. 1824. One of the handsomest species of the genus; closely allied to *G. obtusata*. SYN. *G. vaginata*. (S. B. F. G. 138.)

G. obtusata (blunt). *fl.* yellow. May. *l.*, radical ones ensiform-linear, obtuse. *h.* 1ft. 1801. (B. M. 672.)

G. Rochensis (De la Roche's).* *fl.* blue, crimson-spotted centre May. *l.* radical, linear, acute. Stem smooth. *h.* 9in. 1790. (B. M. 598, under name of *Ixia Rochensis.*)

G. secunda (side-flowering). *fl.* white. May. *l.*, radical ones linear-acute. Stem villous. *h.* 1ft. 1795. (B. M. 1105, under name of *Ixia secunda.*)

G. setacea (bristle-leaved). *fl.* sulphur-coloured. June and July. *l.*, radical ones bristly. Stem simple, few-flowered. *h.* 1ft. 1809. (B. M. 1255.)

G. vaginata (sheathed). A synonym of *G. inflexa*.

GELASINE (from *gelasinos*, a smiling dimple; a poetic allusion to the delicacy of the flowers). ORD. *Irideæ*. *G. azurea* is a pretty hardy bulbous plant, native of South America. For culture, &c., *see* **Romulea.**

G. azurea (blue). *fl.* blue; petals dotted with white and black at base; spathe many-flowered, shorter than peduncles; peduncles clasped closely by three or four bracts. May. *l.* plicate, 1½ft. to 2ft. long. *h.* 1ft. 1838. (B. M. 3779.)

GELONIUM. This genus is now included, by the authors of the "Genera Plantarum," under **Ratonia** (which *see*).

GELSEMIEÆ. A tribe of *Loganiaceæ*.

GELSEMIUM (from *Gelsemino*, an Italian name of the Jessamine). SYNS. *Leptopteris* and *Medicia*. ORD. *Loganiaceæ*. A genus comprising three species of twining glabrous shrubs, one from North America, another from Sumatra, and the third from China. Flowers yellow, showy; corolla infundibuliform; tube sub-cylindrical; throat dilated. Leaves opposite, membranaceous. *G. sempervirens*, the only species yet known to cultivation, is a

Gelsemium *continued.*

half-hardy shrub. It thrives in a rich loamy soil, and may be propagated by cuttings, placed under a hand glass.

G. nitidum (shining). A synonym of *G. sempervirens.*

G. sempervirens (evergreen). *fl.* fragrant; corolla deep yellow, over 1in. long; peduncles very short, axillary; stigmas of one form and anthers of the other protruding. Spring. *l.* evergreen, thin-coriaceous, shining, oblong or ovate-lanceolate, 1½in. to 2in. long. Stem slender. Southern United States, 1840. SYN. *G. nitidum.*

GEMINATE. United in pairs.

GEMINIFLOROUS. Twin-flowered; when two flowers grow together.

GENETYLLIS. A synonym of **Darwinia** (which *see*).

GENICULATE. Bent abruptly, like a knee, *e.g.*, the stems of many grasses.

GENICULUM. The node of a stem.

GENIPA (from Genipapo, the Guiana name of one of the species). Genip-tree. ORD. *Rubiaceæ.* A genus comprising about eight species of stove evergreen shrubs or small trees, natives of tropical America and the West Indian Islands. Flowers white, at length yellow, axillary or terminal, solitary or few; corolla narrow, campanulate; tube short; throat glabrous or villous. Fruit succulent, with a rather thick rind, crowned by the calyx, and tapering at each end. Leaves sessile or shortly pedunculate, opposite, coriaceous, obovate, or lanceolate, clear; stipules interpetiolar, ovate, acuminated, deciduous. For culture, *see* **Gardenia,** to which the genus is closely allied. The species enumerated below flower in summer.

G. americana (American). Genipap Fruit. *fl.* small; peduncles axillary, dichotomous, corymbose. *fr.* greenish-white, large, full of dark purple juice; pulp edible, rather acrid. *l.* oblong-lanceolate, quite glabrous on both surfaces. *h.* 20ft. to 30ft. West Indian Islands, &c., 1779.

G. Caruto (native name). *fl.*, corolla white, having the tube silky both inside and outside; peduncles terminal, two or three-flowered. *l.* obovate, obtuse, glabrous above, clothed with velvety tomentum beneath. *h.* 20ft. West Indian Islands, &c.

G. Merianæ (Merian's). *fl.* nearly sessile, crowded at the tops of branches. Berry hairy, umbilicate; pulp edible. *l.* oblong-ovate. *h.* 20ft. Guiana, 1800.

G. oblongifolia (oblong-leaved). *fl.* crowded at the tops of the branches, on short pedicels, and disposed somewhat racemosely. *fr.* the size of a peach. *l.* oblong-ovate, obtuse, shining above, and downy on the nerves beneath, with rather revolute margins. *h.* 20ft. Peru, 1821. The seeds and pulp of the fruit of this species are used by the Indians as a dye.

GENIPAP FRUIT. *See* **Genipa americana.**

GENIP-TREE. *See* **Genipa.**

GENISTA (the old Latin name used by Virgil). ORD. *Leguminosæ.* A large genus (about seventy species have been described) of pretty dwarf-growing unarmed or prickly, greenhouse or hardy shrubs, natives of Europe, Northern Africa, and Western Asia. Flowers yellow, rarely white, produced either singly or in clusters from the angles of the leaves, or at the ends of the branches. Leaves simple or trifoliolate. The hardy species are very pretty plants for growing on rockwork, in almost any ordinary soil, where they will flower continuously throughout the summer. All hardy, except where otherwise stated. For general culture, *see* **Cytisus.**

G. ætnensis (Etna). *fl.*, racemes terminal. June and July. *l.* few, linear, silky. *h.* 6ft. to 15ft. Sicily and Sardinia, 1816. Plant erect, much branched. (B. M. 2674, under name of *Spartium ætnensis.*)

G. anglica (English). Needle Furze; Pettywhin. *fl.*, racemes few-flowered, terminal; floriferous branches unarmed. Summer. *l.* ovate-lanceolate; spines simple. Root woody, long, creeping. *h.* 1ft. to 2ft. Europe (Britain). Plant smooth. (Sy. En. B. 326.)

G. anxantica (Anxantic). *fl.* racemose. Summer. *l.* ovate-elliptic, rather coriaceous, veiny. Branches angular; stems diffuse. Naples, 1818. Plant quite diffuse. (S. F. G. ii. 200.)

G. ephedroides (Ephedra-like). *fl.* rather silky, alternate, spicate. Summer. *l.* few, sessile, trifoliolate, and simple; leaflets linear, smoothish. Branches spinescent, stiff, terete, at length striated. *h.* 2ft. to 3ft. Corsica and Sardinia.

G. hispanica (Spanish). *fl.*, racemes terminal, somewhat capitate; floriferous branches unarmed. Summer. *l.* lanceolate, villous; spines branched, stiff. *h.* 6in. to 12in. South-western Europe, 1759. (L. B. C. 1733.)

Genista—*continued.*

G. ovata (ovate). *fl.* in short racemes. Summer. *l.* ovate, or ovate-oblong, hairy. Stems numerous, hairy, erect, somewhat herbaceous, striated, terete. *h.* 2ft. to 4ft. Central and Southern Europe, 1816. (L. B. C. 482.)

G. pilosa (hairy). Greenweed. *fl.* axillary, on short pedicels. Summer. *l.* obovate-lanceolate, obtuse, complicated, downy. Stem procumbent, striated, branched. Europe (Britain). (Sy. En. B. 327.)

G. radiata (rayed). *fl.*, heads two to four-flowered, terminal. Summer. *l.* trifoliolate, nearly sessile, opposite; leaflets linear, rather silky. Branches angular, crowded, glabrous. *h.* 1ft to 3ft. South Europe, 1758. (B. M. 2260, under name of *Spartium radiatum.*)

G. Retama (Retam). *fl.* white, silky; racemes lateral, few-flowered. Summer. *l.* very few, linear-oblong, pubescent. Branches erect, slender, twiggy, flexible. *h.* 2ft. to 4ft. Spain, Portugal, &c., 1670. (B. M. 683, under name of *Spartium monospermum.*)

G. sagittalis (arrow-jointed). *fl.* disposed in an ovate, terminal, leafless spike. Spring. *l.* ovate-lanceolate. Stems prostrate; branches herbaceous, ascending, two-edged, membranous. *h.* 6in. South Europe, 1750.

G. tinctoria (dyers'). Dyers' Greenweed. *fl.* disposed in spicate racemes, smooth. Spring and autumn. *l.* lanceolate, smoothish. Stems erect; branches terete, striated, erect. *h.* 1ft. to 2ft. Europe (Britain), North and West Asia. This species, of which there is a very pretty double-flowered form, yields a yellow dye.

G. triangularis (triangular). *fl.*, racemes terminal, short. Summer. *l.* trifoliolate, the upper ones simple; leaflets ovate-lanceolate, villous. Branches triquetrous, decumbent. *h.* 2ft. to 4ft. South Europe. (B. M. 314, under name of *G. triquetra.*)

G. virgata (twiggy). *fl.* silky, disposed in something like racemes. March. *l.* oblong-lanceolate, rather silky. Branches twiggy, terete, striated. *h.* 3ft. to 4ft. Madeira, 1777. (B. R. xxx. 11.)

GENTIAN. *See* **Gentiana.**

GENTIANA (*Gentiane*, a name used by Dioscorides, so called in honour of Gentius, a King of Illyricum, who imprisoned the Roman Ambassadors at the request of Perseus, King of Macedonia; he is said to have been the first who experienced the virtues of Gentian). Gentian. SYN. *Selatium.* Including *Pneumonanthe.* ORD. *Gentianeæ.* A large genus (about 180 species) of hardy, annual or perennial herbs, dispersed throughout temperate and alpine (rare in Arctic) regions. Flowers blue, violet, purple, yellow, or white, axillary and terminal, sessile or rarely pedunculate, erect. Leaves opposite, often sessile. Gentians are among the most beautiful of hardy plants, and some have flowers of a deeper and more intense blue colour than can be found in almost any other genus. Unfortunately, they are, in many localities, most difficult to establish; and some species, *G. verna* for instance, can rarely be induced, under artificial conditions, to increase and blossom as it does in a natural state. All Gentians are extremely sensitive of root disturbance, caused by their being divided or transplanted; consequently, any that are established should be allowed to remain, unless their removal is an absolute necessity.

Propagation is effected by seeds, which ripen in this country; and, in one or two instances, by division of the plants, although this is not recommended, for the reasons already given. *G. acaulis* withstands division, perhaps, better than any of the others, and, being rather plentiful, it is frequently used as an edging plant, more especially in Scotland, and in some of the cooler parts of England. Early in spring, just as growth commences, is the best time for division, which should be carefully performed, without undue injury being caused to the roots. Species like *G. cruciata*, which have their flower-stems proceeding from one rootstock, will not admit of increase by this method. Seeds are slow in vegetating, especially if they are old, or have been stored in a very dry place. When gathered from home-grown plants, they should be sown as soon as ripe; and, if this is done during the latter part of summer, germination may be expected (although it does not always take place) the following spring. If seeds are imported or purchased from nurserymen, the process may take one or two years, and

Gentiana—*continued.*

then be uncertain. Well-drained pots or pans should be prepared, and filled with a compost consisting chiefly of loam and sand, made rather fine. The seeds must only be lightly covered and watered, the pans being afterwards wintered in a frame from which frost is merely excluded. Raising Gentians from seed is a slow process, requiring considerable care in watering, and in potting or pricking off the young plants, so as to avoid injury to the tender roots. But little growth will be made by the majority of perennial species during the first year, and they should not be fully exposed outside, at least before the second season. It usually takes three or four years to obtain sizes large enough for flowering.

Cultivation. Nearly the whole of the Gentians require plenty of moisture when making their growth, although thorough drainage is also essential. To insure this, extra attention should be given in the first place, and permanent positions selected. Some species succeed fairly well in various situations, either with or without shade. A good depth of loamy soil, having stones intermixed, and some of the latter placed round the plants, is the best preparation for them, this mixture requiring the addition of some peat for such as have thick stocks or long tap roots. An open position at the base of rockwork, or in the open border, should be chosen for the taller-growing species; and those which are very dwarf alpines, from high elevations, should be provided with a place on rockwork, specially prepared to insure sufficient moisture at the season when it is required. A cool place should be selected for the treatment of the species from the Himalayas. Any that are difficult to manage, and are not found to succeed, should be provided with a top-dressing of new soil, or other extra attention, in preference to lifting them, unless the proper and requisite cultural requirements have been neglected when planting in the first place. In Scotland, *G. verna* is successfully cultivated in pans, being planted and left undisturbed, with the exception of an annual top-dressing. The pans, with their contents, are wintered in cold frames, and plunged, in spring, in the open ground, where the plants flower and remain for the summer. Stones are most useful round the roots of those planted out, on account of the moisture which they retain in dry weather. All the species described below are perennials.

FIG. 91. GENTIANA ACAULIS.

G. acaulis (stemless).* Gentianella. *fl.* blue, with five yellow marks inside, very large, 2in. long; corolla campanulate; segments obtuse, mucronate. March to May. *l.* opposite, decussate; radical ones crowded, imbricated. Stems tetragonal, one-flowered. *h.* 2in. to 4in. Alps and Pyrenees. See Fig. 91. (B. M. 52.) There are several forms of this handsome species.

G. adscendens (ascendent). *fl.* blue; corolla campanulate.

Gentiana—*continued.*

five-cleft, toothed between the segments; calyx three-toothed, opening on one side. June and July. *l.* lanceolate. *h.* 9in. Siberia, 1799. (B. M. 705.) There is a form of this species, *minor* (B. M. 723).

FIG. 92. FLOWERING BRANCHES OF GENTIANA AFFINIS.

G. affinis (related).* *fl.* blue; corolla narrowly funnel-shaped, 1in. or less long; calyx lobes linear or subulate, unequal. Summer. *l.* from oblong or lanceolate to linear. Stems clustered, 4in. to 12in. high. North America. See Fig. 92.

G. algida (cold).* *fl.* milk-coloured, marked with bluish dots and stripes; limb of a livid blue colour, terminal and lateral, pedicellate; corolla ten-cleft, campanulate, large. June and July. *l.* linear-lanceolate. Stems obsoletely tetragonal, or nearly terete. *h.* 3in. to 6in. Siberia, 1808. See Fig. 93.

G. Andrewsii (Andrews's).* *fl.* blue, crowded, in axillary and terminal fascicles, sessile; corolla campanulately ventricose, with five obtuse entire segments, and five smaller accessory fringed ones. August. *l.* oblong-lanceolate. Stems terete. *h.* 1ft. to 2ft. North America, 1776. (B. M. 6421.)

G. asclepiadea (Swallow-wort-like).* *fl.*, terminal ones crowded, axillary ones solitary, all nearly sessile; corolla large, campanulate, three times longer than the calyx, five-cleft; segments ovate, acute. July. *l.* ovate-lanceolate, stem-clasping, with repand edges. Stems obsoletely tetragonal. *h.* 6in. to 18in. Southern and Eastern Europe, 1629. (B. M. 1078.)

G. bavarica (Bavarian).* *fl.* deep blue; corolla funnel-shaped, ten-cleft; segments entire, or slightly serrated, the accessory ones small, horn-formed. July. *l.* ovate, obtuse; radical ones crowded, imbricated, longer than the cauline ones. Stems one-flowered. *h.* 3in. Central Europe, 1775.

G. Burseri (Burser's). *fl.* yellow, verticillate; corolla usually five-cleft, campanulate, dotted; segments lanceolate, with a small accessory tooth between each. July. *l.* opposite, ovate, apiculated, sheathing at the base. *h.* 2ft. Pyrenees, 1820.

G. Catesbæi (Catesby's). *fl.* pale blue, terminal, fasciculate; corolla ten-cleft, campanulate, somewhat ventricose or barrel-shaped; the five regular segments acutish, the five accessory ones jagged. August. *l.* short, elliptic-ovate, acute, with scabrous edges. Stem terete, minutely downy. *h.* 6in. to 12in. Carolina, 1803.

G. ciliata (fringed). *fl.* light blue; corolla four-cleft; segments serrated, finely cut in the middle. August and September. *l.* lanceolate and linear. Stem flexuose, angular. *h.* 9in. Germany, 1759. (B. M. 639.)

G. crinita (hairy). *fl.* light blue; corolla four-cleft; segments finely cut. June and July. *l.* lanceolate, acute. Stem erect, rounded. *h.* 6in. North America, 1804. (B. M. 2031.)

G. cruciata (crossed).* *fl.* terminal and axillary, crowded, nearly sessile; corolla tubularly campanulate, eight-cleft (regular segments acute, four accessory ones small, acutely bifid or jagged), with a pale tube, widened upwards, and a pale blue limb, dotted with green in the throat. June and July. *l.* broad-lanceolate, connate at the base. Stems ascending, terete. *h.* 6in. Europe, 1596.

G. Fortunei (Fortune's).* *fl.* axillary, solitary, sessile; corolla funnel-shaped, slightly ventricose; limb of five spreading cordate-ovate lobes, deep blue, and equally spotted with white. December. *l.* opposite, the lowest small and ovate, the rest lanceolate, glabrous, three-nerved. North China, 1853. A very handsome greenhouse species. (B. M. 4776.)

G. gelida (ice-cold). *fl.* axillary and terminal, aggregate; corolla campanulate, with bluntish segments, the five accessory ones short and jagged. June and July. *l.* lanceolate. Stems ascending, tetragonal. *h.* 6in. Caucasus, 1807.

G. intermedia (intermediate). A synonym of *G. ochroleuca*.

G. Kurroo (native name).* *fl.* erect or inclined, pedicellate; corolla tube narrowly campanulate; lobes five, broadly ovate, acute or acuminate, azure-blue, sprinkled towards the throat with white. October. *l.* elongate-linear or oblong-lanceolate, obtuse or acute, concave, very coriaceous, bright green. Himalaya Mountains, 1879. A very handsome plant for the rock garden. SYN. *Pneumonanthe Kurroo*. (B. M. 6470.)

G. linearis (linear-leaved). *fl.* blue, one to five, in a terminal

FIG. 93. GENTIANA ALGIDA, showing Habit, and detached Portion of Inflorescence (enlarged).

Gentiana—*continued.*

involucrate cluster; corolla 1in. or more long; calyx lobes shorter than the tube. Summer. *l.* linear or narrowly lanceolate. Stem slender, 1ft. to 2ft. high. North America. SYN. *G. Pseudo-pneumonanthe.*

G. lutea (yellow).* *fl.* verticillate, sub-cymose; corolla yellow, veiny, and spotted, rotate, five or six-cleft. July. *l.* broad, ovate; radical leaves ovate-oblong; cauline ones sessile, ovate, acute. *h.* 4ft. to 6ft. Europe, 1596. This species furnishes the Gentian root of commerce.

G. macrophylla (large-leaved). *fl.* terminal, verticillately aggregate, involucrated by usually four floral leaves; corolla pale blue, small, tubularly campanulate, four or five-cleft, with short acutish segments. July. *l.*, radical ones lanceolate, length of stem. Stems nearly terete, almost naked in the middle. *h.* 6in. to 12in. Siberia, 1796. (B. M. 1414.)

G. ochroleuca (yellowish-white). *fl.* blue, terminal, aggregate; calyx foliaceous, unequal; corolla ventricose, five-fid. *l.* obovate-oblong, three-nerved. *h.* 6in. United States, 1820. SYN. *G. intermedia.* (B. M. 2303.)

G. ornata (adorned).* *fl.* solitary and sessile at the ends of the branches; corolla tube whitish, striped with blue, sub-cylindric, a little inflated; lobes intensely blue, five, small, triangular-ovate, acute. May. *l.* ovate-lanceolate or linear-lanceolate, acute, acuminate or obtuse, deep green, with a pale midrib. Himalayas. (B. M. 6514.)

G. pannonica (Pannonian). *fl.* verticillate, axillary, and terminal; corolla purple, beset with dots, campanulate, six or seven-cleft, rather membranous; tube yellowish. July. *l.*, radical ones ovate, apiculate; cauline ones ovate, lanceolate; floral ones acuminated. Stem obsoletely tetragonal. *h.* 1ft. to 2ft. Alps of Europe.

FIG. 94. GENTIANA PNEUMONANTHE, showing Habit and detached Single Flower.

G. Pneumonanthe.* Wind Flower. *fl.* terminal and axillary, pedunculate; corolla deep blue, having the accessory segments small and green, funnel-shaped, five-cleft. August. *l.* linear-spathulate, obtuse. Stems simple, tetragonal. *h.* 6in. to 12in. Northern hemisphere (Britain). See Fig. 94. There are white and other varieties of this species.

G. Pseudo-pneumonanthe (bastard Wind Flower). A synonym of *G. linearis.*

G. punctata (dotted).* *fl.* verticillate; corolla yellow, dotted with numerous irregular purple spots, campanulate, six to eight-cleft, large. June. *l.* ovate, acutish; lower ones petiolate, superior ones acuminated. Stem sub-tetragonal. *h.* 1ft. to 2ft. European Alps, 1775.

G. purpurea (purple). *fl.* from three to eight together, terminal, the axillary ones usually solitary; corolla purplish, marked with dots in lines inside, coriaceous, campanulate; tube striated with greenish-yellow. June, July. *l.*, radical ones ovate; cauline ones ovate-lanceolate; upper ones broad-lanceolate, combined and sheathing at the base. Stem obsoletely tetragonal. *h.* 1ft. to 2ft. Europe, 1768.

G. pyrenaica (Pyrenean).* *fl.* terminating the branches, solitary; corolla pale green outside, with the limb deep blue above, funnel-shaped, ten-cleft; the accessory segments oblong, obtuse, and crenulated at the apex. April. *l.* lanceolate-linear; radical ones crowded, imbricate; cauline connately sheathing, acute. Stem procumbent, branched at bottom. *h.* 3in. Pyrenees, 1825. (B. M. 5742.)

G. quinqueflora (five-flowered). *fl.* lilac, clustered at ends of stem and branches, three to five together; corolla clavate, five-fid; calyx very short, acute. October. *l.* amplexicaul, deltoid-cordate, three to five-nerved. *h.* 1½ft. North America, 1831. (B. M. 3496.)

FIG. 95. GENTIANA SEPTEMFIDA.

G. septemfida (seven-fid).* *fl.* terminal, one to seven in a cluster; corolla azure-blue, having the tube almost cylindrical, widening upwards, ten-cleft; five accessory segments jagged. June, July. *l.* ovate-lanceolate, obtuse, approximate. Stems tetragonal, erect, simple. *h.* 6in. to 18in. Persia, 1804. See Fig. 95. (B. M. 1229.)

G. s. cordifolia (heart-shape-leaved). *fl.* numerous, in a compact rather elongate head, sessile, or very shortly pedicellate; corolla dark blue, clavate; lobes five, small, ovate, sub-acute. June, July. *l.* all ovate-cordate, sub-acute, five-nerved, dark green above, spreading or deflexed, coriaceous, the upper often forming a sort of involucre. Asia Minor. This plant is often cultivated under the name of *G. gelida.* (B. M. 6497.)

G. verna (green).* *fl.* solitary; corolla azure-blue, salver-shaped, five-cleft, with as many small bifid accessory segments. April, May. *l.* ovate, acutish; radical ones spreading, crowded. Stem branched at bottom. *h.* 3in. England. (B. M. 491.) There are several varieties of this species, including *brachyphylla* (leaves lanceolate, roundish, very short) and *elongata* (stem elongated, filiform, nearly naked).

GENTIANEÆ. A large order of annual or perennial herbs, rarely shrubs. Flowers red, yellow, blue, white, or violet, showy, regular; calyx divided, persistent; corolla persistent, imbricate or induplicate, and often twisted in æstivation; stamens alternate with the lobes of the corolla. The leaves (alternate and trifoliolate in *Menyanthes*) are nearly always opposite (rarely whorled), entire, exstipulate, usually ribbed. There are about forty-nine genera, and 520 species, broadly dispersed through almost all parts of the world; some are found at high elevations, and others in hot tropical plains. Bitterness characterises the whole order. Illustrative genera are: *Chironia, Chlora, Erythræa, Gentiana, Limnanthemum, Lisianthus, Menyanthes,* and *Villarsia.*

GENTIANELLA. *See* **Gentiana acaulis.**

GEODORUM (from *ge*, the earth, and *doron*, a gift). ORD. *Orchideæ.* A small genus of stove terrestrial orchids, natives of East India. Scapes terminating in a nodding spike of flowers, which in some are of a pale green colour, the lip white, veined with purple or yellow lines; and in others blush, with a yellow spot on the lip. Leaves radical, lance-shaped or elliptical. Roots tuberous. The species thrive in fibrous peat, in a hot, damp stove, but require to be rested after the leaves have withered.

G. citrinum (lemon-coloured). *fl.* yellow, close; spike pendulous; lip somewhat spurred at base, blunt and entire at end; scape shorter than leaves. October to December. *l.* lanceolate. *h.* 1ft. East Indies, 1800. (B. M. 2195.)

G. dilatatum (swollen). *fl.* whitish flesh-colour, crowded; sub-labiato-campanulate, nodding; racemes many-flowered, sparsely imbricate. Summer. *l.* 6in. long, 3in. to 4in. broad, erect,

Geodorum—*continued.*

lanceolate; scape leaves short. *h.* 6in. to 12in. India, 1800. (B. R. 675.)

G. fucatum (painted). *fl.* sub-campanulate; sepals pink, linear-oblong, acute; lip ovate, concave, emarginate, entire; scapes radical, erect, clothed, recurved at apex. July. *l.* oblong-lanceolate, acute, plicate, long. *h.* 1ft. Ceylon, 1832. (B. R. 1687.)

GEOFFRÆA (named after Dr. M. E. F. Geoffroy, of Paris, 1672-1731, author of a Materia Medica). Bastard Cabbage-tree. SYN. *Geoffroya.* ORD. *Leguminosæ.* A genus comprising four species of stove evergreen thorny or unarmed trees, natives of tropical America. Flowers yellow, often fœtid, in simple racemes. Seeds edible. Leaves alternate, impari-pinnate; leaflets alternate or sub-opposite. Geoffræas thrive in a compost of loam and peat. Propagated by cuttings, made of ripened shoots, and inserted in sand, under a bell glass, in heat.

G. spinulosa (spinulose). *fl.*, racemes forming a spreading panicle. *l.*, leaflets ovate, obtuse, pubescent, and reticulated beneath; petioles winged. Branches covered with a spongy bark. Trunk unarmed. Brazil

G. superba (superb). *fl.* yellow, in simple racemes the length of the leaves. *fr.* about the size and form of a walnut, having a greenish-yellow downy rind, a fleshy pulp, and a hard nut, inclosing a single seed. *l.* closely resembling those of the Tamarind-tree, shining and puberulous above, but glaucous and paler beneath. *h.* 24ft. Brazil. A magnificent tree.

GEOFFROYA. *See* **Geoffræa.**

GEONOMA (from *geonomos*, skilled in agriculture; the allusion is obscure). ORD. *Palmeæ.* A genus of about a hundred species of very elegant dwarf-growing stove palms. Flowers monœcious, disposed on simple or branched spikes. Fruit a small, dry, oval berry. Leaves entire, or more or less pinnately divided, usually of a pale green colour. The present genus is allied to *Chamædorea*, but is less useful for decorative purposes. Geonomas thrive in a compost of two-thirds spongy peat and one of loam, with the addition of a little sand or charcoal. A plentiful supply of water is needed—"indeed, many of them grow best when plunged in a tank; and should any of them fall into bad health, if stood in a tank of water, with a little extra heat, they will speedily recover." They should be confined to the stove, as the constitution of the plants will not admit of their being employed in a permanent manner for indoor decoration; but they may be occasionally used for the dinner table. Nearly all the species are exceedingly handsome, especially in a young state. Propagated by seeds and suckers only.

G. arundinacea (reed-like). *l.* dark green (brown when young), bilobed. Stems cæspitose, cane-like. (G. C. 1872, p. 78.)

G. binervis (two-nerved). *l.* pinnate, pendent, 2ft. to 4ft. long; pinnæ decurrent at base, tapering to a tail-like point, 6in. to 12in. long, dark green; petiole clothed with a network of rough brown fibres. Stem slender. Nicaragua.

G. Carderi (Carder's).* *l.* pinnate, strongly ribbed; pinnæ unequal, [illegible]in. to 2in. broad, upper part confluent into a broad bilobed apex; petioles flat on the upper, rounded and asperous on the lower, face. Columbia, 1876.

G. congesta (crowded).* *l.* 1ft. to 2ft. long, either entire or with a bifid apex, or divided into broad segments, widening upwards, 6in. to 8in. across at the apex; petioles sheathing at base. Stem moderately thick. Costa Rica.

G. elegans (elegant).* *l.* 1ft. long; terminal pinnæ broad, bifid; two lateral pairs broad, decurrent; bright pink when young; petioles sheathing at base. Stem slender, reed-like. Brazil.

G. ferruginea (rusty). *l.* arched, pinnate, 1ft. to 2ft. long, about 8in. broad; terminal one bifid; two lateral pairs broad, sessile; petioles and stems slender. Brazil.

G. Ghiesbreghtiana. *See* **Calyptrogyne Ghiesbreghtiana.**

G. gracilis (slender).* *l.* pinnate, arching, with long linear pinnæ, dark green. A graceful species, resembling *Cocos Weddeliana.* Brazil, 1874.

G. macrostachys (large-spiked). *l.* 1ft. to 1½ft. long, usually divided into three pairs of broad segments, ending in tail like points, deep red when young; petioles light brown, sheathing at the base, tomentose. Stem slender. Brazil, 1823.

G. magnifica (magnificent). *l.* [illegible]ft. to [illegible]ft. long, [illegible]in. to [illegible]in. broad, plaited, unequally pinnate; apex deeply bifid; petioles blackish, sheathing. Stem somewhat stout. Chiapas.

Geonoma—*continued.*

G. Martiana (Martius').* *l.* 1ft. to 2ft. long, 2in. across at the base, gradually increasing to the deeply bifid apex, where it is 9in. wide, reddish-crimson when young; petioles sheathing at base, 6in. long. Stem rather stout. Costa Rica. An extremely beautiful palm, the mature colour of the leaves being a deep metallic green. There is a form known as *Seemannii* sometimes grown.

G. Porteana (Porte's).* *l.* pinnate, 1ft. to 2ft. long, arched; pinnæ sessile, distant, 6in. to 8in. long, 2in. broad; apex deeply bifid. Stem smooth, slender. New Grenada, 1853. An elegant species.

G. procumbens (procumbent).* *l.* pendent, 2ft. to 4ft. long, pinnate; pinnæ pendent, about 1ft. long, 1in. to 2in. broad, very deep green. Stem stout. Described as one of the most beautiful palms in the whole genus.

G. pumila (dwarf).* *l.* broad, deeply cleft at the apex; petioles slender, terete. Tropical America. A pretty dwarf-growing species.

G. Schottiana (Schott's).* *l.* pinnate, 1ft. to 3ft. long; pinnæ long, tapering to a tail-like point; petioles sheathing at base, long, arching. Stem slender. Brazil, 1820.

G. undata (wavy). *l.* arching, irregularly pinnate, 2ft. to 3ft. long; pinnæ plaited, dark green, terminal pinna deeply bifid; petioles sheathing, clothed with rough fibrous tissue at base. Stem stout, 9in. to 12in. in circumference. Venezuela, 1850.

G. Verschaffeltii (Verschaffelt's). *See* **Calyptrogyne Ghiesbreghtiana.**

Other species sometimes seen in cultivation are: *princeps* and *Spixiana.*

GEORCHIS. Included under **Goodyera** (which *see*).

GEORGINA. A synonym of **Dahlia** (which *see*).

GEOTHERMOMETER. A thermometer for determining the temperature of the earth.

GERANIACEÆ. A natural order of herbs, shrubs, or sub-shrubs, rarely arborescent. Flowers often showy; sepals five, imbricate, one of them sometimes spurred; petals five, unguiculate, imbricate or valvate in bud. Leaves opposite or alternate, usually palmately veined and lobed, often stipulate. There are about twenty genera and 750 species, dispersed through the temperate and subtropical regions of the whole world, but especially abounding in South Africa. The species possess astringent and aromatic properties; many of them are fragrant, while others have a musky odour. The members of the tribe *Oxalideæ* abound in oxalic acid, and some have edible tubers. Well-known genera are: *Erodium, Geranium, Pelargonium,* and *Tropæolum.*

GERANIUM (*Geranion*, the old Greek name used by Dioscorides, derived from *geranos*, a crane; referring to the long beak which terminates the carpels). Crane's Bill. ORD. *Geraniaceæ.* A genus containing a hundred species of hardy herbaceous plants, rarely shrubs, dispersed through the temperate regions of the whole world. Flowers equal; sepals and petals five, imbricate in bud; stamens ten, rarely five; inflorescence cymose. Leaves opposite or alternate, stipulate, dentately or palmately (rarely pinnately) lobed or dissected. The genus is represented in Britain by eleven species, some of which are thoroughly well worth growing as ornamental border plants. One of the commonest of them, the Dove's Foot, *G. molle*, is found almost everywhere in waste places and on dry lawns. Geraniums thrive in almost any common garden soil, but prefer a well-drained one. They are excellent subjects for growing on rockwork, banks, or borders. Propagated by divisions, or by seeds.

The host of garden plants popularly known as Show, Fancy, Scarlet, Tricolor, &c., Geraniums, belong to the genus **Pelargonium** (which *see*).

G. albanum (Albanian). *fl.* purple; petals emarginate; peduncles two-flowered, elongated, hispid, May. *l.* kidney-shaped, seven-lobed; lobes trifid; lobules three-toothed. Stem flaccid, simple. *h.* 1ft. Tauria, &c., 1820. SYN. *G. cristatum.*

G. anemonæfolium (Anemone-leaved).* *fl.* purplish-red, large; peduncles two flowered, opposite, erect, smooth. May. *l.* smooth, palmately five-cleft, with bipinnatifidly-cleft segments, upper ones three-parted. Stem suffruticose. *h.* 1ft. to 2ft. Madeira, 1778. Half-hardy shrub. See Fig. 96. (B. M. 206.)

G. argenteum (silvery).* *fl.* pale red, with darker stripes, large; petals emarginate; peduncles almost radical, two-flowered. June and July. *l.* all almost radical, on long petioles, hoary or silky on both surfaces, five to seven-parted, with trifid lobes and linear

Geranium—*continued.*

lobules. *h.* 3in. Northern Italy, 1699. An elegant alpine plant. See Fig. 97.

G. asphodeloides (Asphodel-like). *fl.* usually purplish-violet, few; petals obovate, often truncate, twice as long as the sharp-pointed downy sepals. Summer. *l.* five-lobed; lobes trifid; radical ones long-stalked, very downy. *h.* 6in. South Europe, 1828. (S. F. G. 661.)

Geranium—*continued.*

and clothed with minute adpressed hairs, paler below, cut down nearly or quite to the base into three to five divisions, with several acute, erecto-patent, irregular, deltoid or linear teeth. Stems often 1ft. or 2ft. long, and entangled, generally naked in the lower part, but clothed with short grey glandular pubescence upwards. *h.* 9in. South Africa, 1862. (Ref. B. 147.)

G. cinereum (grey).* *fl.* pale red, with dark stripes; petals

FIG. 96. GERANIUM ANEMONÆFOLIUM.

G. atlanticum (Atlantic).* *fl.* 1½in. in diameter, in terminal, two-flowered, hairy peduncles; sepals elliptic, acuminate; petals pale purple, with red veins, obcordate, three or four times as long as the sepals. June. *l.* orbicular, cut nearly to the base into five or seven narrowly obovate or cuneate, trifid or pinnatifidly laciniated, and toothed segments. Stems 1ft. to 1½ft. high. Algiers, 1878. (B. M. 6452.)

FIG. 97. GERANIUM ARGENTEUM.

G. caffrum (Caffre). *fl.* in pairs, on long slender pedicels; petals pale lilac or white, obovate, emarginate at the apex, considerably exceeding the calyx. June. *l.* 1in. to 3in. broad, full green above,

emarginate; peduncles almost radical, two-flowered. June. *l.* almost radical, stalked, clothed with glaucous pubescence, five to seven-parted, with wedge-shaped trifid lobes. *h.* 6in. Pyrenees, &c. Plant almost stemless.

G. collinum (hill-loving). *fl.* purplish-violet; petals entire, roundish, hardly longer than the calyx. May. *l.* palmately five-parted, with somewhat trilobed lobes, deeply serrated; peduncles and calyces covered with clammy hairs. Stem angular, diffused, and somewhat decumbent, pubescent. Eastern Europe, &c., 1815.

G. cristatum (crested). A synonym of *G. albanum.*

G. dahuricum (Dahurian).* *fl.* purple; petals entire, much bearded at the base; peduncles two-flowered, three times longer than the leaves. June. *l.* opposite, three to five-parted, with cut, acute lobes. Stem erect, smooth, naked at the base. *h.* 1½ft. Dahuria, 1820.

G. Endressii (Endress's).* *fl.* light rose, with darker veins; petals oblong-ovate, entire, fringed at base; filaments densely hairy; peduncles axillary, two-flowered. Summer. *l.* opposite, stalked, palmate; upper ones three-lobed, lower ones five-lobed; lobes acute, serrated. *h.* 1ft. Pyrenees.

G. eriostemon (woolly-stamened). *fl.* pale violet, with white stamens, but purple towards the apex; petals entire, bearded at the base. June. *l.* five-lobed, with ovate deeply-toothed lobes; lower ones on long stalks, alternate; upper ones sessile, opposite. Stem slightly angled, forked, erect. *h.* 6in. to 3ft. Nepaul, 1822. (Sw. Ger. 197.)

G. ibericum (Iberian).* *fl.* blue, large; petals obcordate, or somewhat trifid. Summer and autumn. *l.* five to seven-parted, with pinnately-cut lobes and toothed lobules, villous, dichotomous, erect. *h.* 1ft. Iberia, 1802. A very showy plant. (B. M. 1386.)

G. i. platypetalum (broad-petaled). *fl.* deep violet, with reddish streaks; more than 1in. in diameter; petals emarginate. Summer. *l.* alternate or opposite; lobes five to seven, deeply cut, fringed. *h.* 1ft. to 2ft. Georgia. See Fig. 98.

G. Lamberti (Lambert's).* *fl.* bright lilac, large; petals large, roundish-ovate, concave and veiny; filaments beset with white hairs. Summer and autumn. *l.* opposite, cordate, five-lobed, pilose on both surfaces, soft; lobes wedge-shaped, cut, toothed. Stem diffuse, branched, elongated. Nepaul, 1824. (Sw. Ger. 338.)

G. lucidum (clear). *fl.* bright rose-coloured, small. May to

Geranium—*continued.*

August. *l.* roundish, five-lobed, shining. Stem spreading in every direction. *h.* 6in. to 12in. Europe (Britain), North Africa, Asia. Annual or biennial. (Sy. En. B. 304.)

G. macrorhizon (large-rooted).* *fl.* deep red or bright purple; petals entire, a little reflexed; calyces globose, inflated. May to July. *l.* smooth, five-parted, with the lobes toothed at the apex. Stem suffruticose at the base, dichotomous at the apex. *h.* 1ft. South Europe, 1576. (B. M. 2420.)

G. maculatum (spotted).* *fl.* pale lilac, varying in size; petals obovate, entire. Summer. *l.* three to five-parted, with deeply-toothed lobes; radical ones on long stalks; upper ones opposite, sessile. Stem rather angular, erect, dichotomous, pubescent. *h.* 1½ft. North America, 1732. (B. M. Pl. 42.)

FIG. 98. FLOWERING BRANCH OF GERANIUM IBERICUM PLATYPETALUM.

G. ornithopodum (bird's-foot). *fl.* in pairs, on densely downy, drooping, slender pedicels; petals white, and veined with red. *l.* roundish in general outline, downy principally on the lower face, palmately five-lobed, usually at least half-way down, with pinnatifid divisions. Stems densely clothed with soft, short, decurved, whitish hairs. *h.* 4ft. to 5ft. Cape Colony, 1872. A diffusely-branched half-hardy perennial herb. (Ref. B. 290.)

G. phæum (dusky).* *fl.* dark brown, almost black, with a white spot at the base of each petal; petals spreading and entire. May and June. *l.* five to nine-lobed, deeply toothed; upper ones sessile. Stem round, forked. Central and Western Europe; naturalised in Britain. (Sy. En. B. 294.)

G. pratense (meadow).* *fl.* blue, large; petals entire; peduncles somewhat corymbose. Summer. *l.* seven-parted, with sharply-pinnatifid and deeply serrated, linear lobes. Stem round, erect, downy. *h.* 2ft. to 3ft. Europe (Britain), Siberia. (Sy. En. B. 297.) There is a double-flowered form of this species, which makes an excellent border plant.

G. Robertianum. Herb-Robert. *fl.* bright crimson, small; petals entire. Summer and autumn. *l.* three to five-parted, with trifid pinnatifid lobes. *h.* 6in. to 9in. Europe (Britain), Asia, North Africa. (Sy. En. B. 305.)

G. R. alba (white). A white-flowered form, well worthy of a place on the rockery or in the herbaceous border.

G. sanguineum (bloody).* *fl.* crimson or blood-red, large, about 1½in. across; petals notched; peduncles one-flowered, axillary, much longer than the petioles. Summer. *l.* opposite, five to seven-parted, with trifid lobes and linear lobules. Stems erect or diffuse, branched. *h.* 1ft. to 2ft. Europe (Britain), West Asia. A very handsome species. (Sy. En. B. 293.)

G. s. lancastriense (Lancaster). *fl.* flesh-coloured, with purple veins, large.

G. striatum (streaked).* *fl.* pink, elegantly striped with darker veins; petals emarginately two-lobed. May to October. *l.*, lower ones five-lobed, upper ones three-lobed; the lobes ovate, acute, deeply toothed. Stem round, decumbent. South Europe, 1629. (B. M. 55.)

G. sylvaticum (wood).* *fl.* purple or blue, with crimson veins; petals somewhat emarginate; peduncles rather corymbose. June and July. *l.* five to seven-lobed; lobes oblong, deeply toothed. Stem round, erect. *h.* 2ft. Europe (Britain), Siberia, West Asia. (Sy. En. B. 296.)

G. tuberosum (tuberose). *fl.* purple, large, numerous, elegant; petals bifid. May. *l.* many-parted; lobes linear, pinnatifid, serrated. Stem, from the base to the fork, naked. *h.* 9in. South Europe, &c., 1596. (Sw. Ger. 155.)

FIG. 99. GERANIUM WALLICHIANUM.

G. Wallichianum (Wallich's).* *fl.* purple, large; petals emarginate. June. *l.* five-parted, with broadly cuneate-ovate, deeply toothed lobes, clothed on both surfaces, as well as the stem, with silky hairs. Stem decumbent, purple. Temperate Himalaya, 1820. See Fig. 99. (B. M. 2377.)

GERARDIA (named in honour of John Gerard, 1545-1607, author of the famous "Herbal," 1597, and a great cultivator of exotic plants). SYN. *Virgularia.* ORD. *Scrophularineæ.* A genus containing about thirty species of annual or perennial, erect, branching herbs, natives of North and South America. Corolla rose-purple or yellow, the former colour rarely varying to white. Leaves

FIG. 100. GERARDIA QUERCIFOLIA, showing Habit and detached Flowers.

Gerardia—*continued.*

usually opposite, the uppermost reduced to bracts of the racemose or paniculate showy flowers. Considerable difficulty is experienced in the cultivation of this genus (owing to its being more or less root-parasitic); hence, it is but rarely represented in English gardens. Imported seeds frequently germinate, and the plants thrive in rich, friable soil, in a warm, sheltered situation.

G. pedicularia (Louse-wort). *fl.* citron-yellow, varying to deep yellow, sometimes assuming a reddish tint. *l.* pinnatifid, cut toothed. *h.* 2ft. to 3ft. United States. Perennial. A smaller, but more branching species than *G. quercifolia*, having smaller and less numerous flowers, about 1in. long. (G. C. 1872, p. 43.)

G. purpurea (purple). *fl.* purple; corolla 1in. or less long; pedicels shorter than the calyx, mainly opposite. July. *l.* usually spreading, narrowly linear, either somewhat scabrous or smooth, with merely scabrous margins. Branches virgate, rather spreading. *h.* 1ft. to 2ft. United States, 1772. Annual. A marked variety of this variable species, *G. p. paupercula*, is figured in B. M. 2048, under the name of *G. purpurea.*

G. quercifolia (Oak-leaved). *fl.*, corolla yellow, nearly 2in. long, tubularly campanulate; calyx large, a little inflated. July and August. *l.*, lower ones large, bipinnatifid; upper ones oblong-lanceolate, pinnatifid or quite entire. *h.* 3ft. to 6ft. United States, 1812. Perennial. See Fig. 100.

GERMANDER. *See* **Teucrium Chamædrys.**

GERMANEA. A synonym of **Plectranthus.**

GERMAN IVY. *See* **Senecio mikanioides.**

GERMEN. The ovary.

GERMINATION. The first act of growth in the embryo plant. Its immediate causes are the presence of moisture, atmospheric air, and a certain temperature above freezing point, varying in elevation, of course, with the nature of the species. Heat excites the vitality of the embryo plant, and enables it to take advantage of the agents with which it is in contact. It has generally been considered that the seed should be excluded from direct light at first, but this has been proved to be quite unnecessary in very many cases.

GEROPOGON. Now included under **Tragopogon** (which *see*).

GESNERA (named after Conrad Gesner, of Zurich, 1516-1565, a famous botanist and natural historian). Including *Rechsteinera.* ORD. *Gesneraceæ.* A genus of about fifty species of very elegant stove perennials, mostly natives of Brazil; a few, however, are dispersed through Guiana, Columbia, and Peru, one extending to Mexico. Flowers disposed in opposite cymes, constituting a terminal thyrse; peduncles furnished with floral leaves or bracts at the base; corolla tube often elongated, sometimes distinctly ventricose, often curved and gibbous at the base; limb regular, or two-lipped. Leaves opposite. The species are mostly tuberous-rooted and herbaceous.

Cultivation. Propagation is effected by the increase of tubers; also by cuttings of the shoots, inserted in peat, soon after the plants are started, and by leaf cuttings, detached and put in when they are fully matured. The flowering season of Gesneras may be considerably prolonged by starting successional batches from March until midsummer. Thorough drainage is essential, and peat and leaf soil, with the addition of a little loam and sand, forms a good compost, which should only be pressed moderately firm in potting. The bulbs may either be grown singly, in 5in. pots, or about five arranged over one 6in. in diameter; they should be covered with 1in. of soil, and kept rather dry until growth commences, when the quantity of water may be increased, according to the amount of roots. Shade from bright sunshine, in summer, is necessary, and care must be taken to keep the leaves clean, as in many species these are extremely attractive and beautifully marked. Syringing is not recommended after the leaves are developed; the water, in nearly all cases, contains lime in solution, and, as evaporation takes place, a sediment is left and retained amongst the minute hairs on the leaves

Gesnera—*continued.*

of such plants as Gesneras, greatly to their disfigurement, when in flower. The plants succeed best on a moist bottom, such as a bed of coal ashes, in a house kept, in summer, at about 65deg. by night, and, in winter not below 55deg. When flowering is over, they should be gradually ripened and dried off, until all the foliage is dead, when water should be entirely withheld, and the pots stored, with their contents, in a dry part of the stove, where they may remain until starting time the following year. Thrips are frequently very troublesome on the young leaves, and should be carefully looked for and destroyed by fumigating, when in a young state. Sponging is sometimes practised, but the leaves are very brittle, and easily broken. If it can be avoided, the plants should not be placed in any house where these insects, or other pests, are present.

G. aggregata (aggregated). *fl.* scarlet; corolla clavate, cylindrical; peduncles axillary, one-flowered, aggregate. August. *l.* opposite, oblong-ovate, crenate. Branches rounded. *h.* 2ft. Brazil, 1816. (B. M. 2725; B. R. 329.)

G. bulbosa (bulbous). *fl.* scarlet; cymes many-flowered, spreading from the axils of the leaves, and disposed upwards in a terminal thyrse. Summer. *l.* opposite, broad-ovate, cordate, serrate. Stem erect. *h.* 2ft. Brazil, 1816. Plant villous. (B. M. 3041.)

G. chromatella (yellow). *fl.* rich yellow, drooping, in elegant erect spikes. Summer. *l.* rich dark velvety. Garden variety.

G. cinnabarina. *See* **Nægelia cinnabarina.**

G. cochlearis (spoon-leaved). *fl.* scarlet, in simple racemes; tube of corolla long, inflated beneath; limb five-lobed; pedicels elongated. June to August. *l.* opposite, on long petioles, cordate-ovate, concave, tomentose, rugose. *h.* 1ft. Brazil, 1837. (B. M. 3787.)

G. Cooperi (Cooper's).* *fl.* bright scarlet, with a densely spotted throat, drooping. May. *l.* light green. *h.* 2ft. Brazil, 1829.

G. discolor (two-coloured). *fl.* scarlet, pendulous; corolla glabrous, clavately cylindrical; pedicels elongated, slender, aggregate. June to September. *l.* large, opposite, petiolate,

FIG. 101. FLOWERING BRANCH OF GESNERA ELLIPTICA LUTEA.

Gesnera—*continued.*

cordate-ovate, crenated, downy. *h.* 2ft. Brazil, 1839. (B. R. 1851, 63.)

G. Donkelaariana (Donkelar's).* *fl.* bright vermilion, about 2in. long, freely produced in terminal heads. June. *l.* nearly cordate, about 8in. across, green, tinged with purple and red. *h.* 1ft. to 2ft. Columbia. (B. M. 5070.)

G. elliptica lutea (elliptic, yellow-flowered). *fl.*, corolla yellow; limb obliquely bilabiate; peduncles terminal, racemose and axillary, solitary. May. *l.* opposite, elliptic, wrinkled, serrate; lower ones petiolate, upper ones sessile. *h.* 1ft. Santa Martha, 1844. See Fig. 101. (B. M. 4242.)

G. exoniensis (Exeter).* *fl.* deep orange-scarlet, with a yellow throat, numerously produced in closely-set masses, about 1ft. through. Winter. *l.* dark rich velvety, covered with minute red hairs. Garden hybrid.

G. glaucophylla (glaucous-leaved). *fl.* deep orange-red; throat light, spotted with orange. Summer. *l.* glaucous, prettily mottled, covered with red hairs.

G. Hondensis (Honda). *fl.* yellowish-red, hairy, ventricose at top; peduncles axillary, one-flowered, by twos and threes. May. *l.* opposite, somewhat obliquely ovate oblong, crenulated, woolly beneath. *h.* 1ft. Brazil, 1845. (B. M. 4217.)

FIG. 102. GESNERA REFULGENS.

G. Lindleyana (Lindley's). *fl.* freely produced; upper part of tube rosy-pink; lower part and limb yellow, freckled with red. July. *l.* broadly ovate, rich deep velvety-green and red. Brazil, 1825.

G. Marchii (March's). A synonym of *G. pendulina*.

G. nægelioides (Nægelia-like).* *fl.* bright rosy pink, marbled with red, large, tubular; throat yellow, dotted with red. Summer. *l.* cordate-ovate, deep green, hairy on the margins and roughly toothed. An elegant garden hybrid, with numerous varieties, of which the following are a selection:

G. n. aureo-roseum (golden-rose). *fl.* bright rosy-lilac; upper portions of the limb pale rose colour, lower part beautifully spotted with carmine; throat marked with orange-yellow. *l.* ovate-acuminate.

G. n. bicolor (two-coloured). *fl.*, upper half rosy-red, lower orange-yellow; limb and throat orange-yellow, profusely spotted with red. *l.* ovate lanceolate, serrated, purplish-red on the under side, bluish metallic-green on the upper.

G. n. candida (white). *fl.* pure white, marked with pale yellow in the throat, tubular; produced in great profusion. *l.* broadly-ovate, toothed, deep green. Stems erect, branching.

G. n. corallina (coral-red). *fl.* rich deep red, almost maroon; throat orange-yellow, profusely spotted with red. *l.* deep green, coarsely toothed. Stems red.

G. n. lilacinella (lilac). *fl.* delicate lilac-colour, beautifully marbled with a deeper tint of the same colour; throat lemon colour; produced in profusion upon the numerous laterals, and

Gesnera—*continued.*

from the base of the leaves upon the main stem, upon long footstalks. *l.* large, cordate, coarsely toothed, deep bright green above, paler and woolly below.

G. n. scintillans (glistening). *fl.*, outside deep plum-colour; limb rosy-red; throat orange-yellow, streaked and dotted crimson, about 2in. long in the tube, and nearly as much across the limb; produced in large lateral heads towards the tops of the shoots. *l.* somewhat oblong, serrated, bright green above, pale below, tinged with red.

G. nigrescens (blackish). *fl.*, tubes dark red; throat light orange, spotted. *l.* large, dark velvety. Garden hybrid.

G. pendulina (pendulous). *fl.* scarlet, numerous, in whorls; corolla drooping, cylindrical, gibbous at top; limb five-lobed. August. *l.* three in a whorl, petiolate, ovate, crenate. *h.* 3ft. Mexico, 1844. SYN. *G. Marchii* (under which name it is figured in B. M. 3744).

G. purpurea (purple). *fl.* purple; panicle sub-verticillate; corolla with a long tube, upper lip straight, two-lobed. June to September. *l.* whorled, cordate-oblong, toothed, downy. *h.* 2ft. Brazil, 1849.

G. pyramidalis (pyramidal).* *fl.* deep orange-red; throat and lip light orange, spotted. Winter. *l.* 7in. broad, nearly round, with a dark velvety ground. Garden hybrid.

G. refulgens (refulgent). *fl.* rich deep red. Summer. *l.* cordate-ovate, clothed with short blood-coloured hairs. *h.* 1ft. to 1½ft. A beautiful plant, of garden origin. See Fig. 102.

G. tuberosa (tuberous-rooted). *fl.* scarlet; peduncles from base of rhizome. August. *l.* broad-ovate, toothed, cordate at base, downy. Stem on horizontal rhizome. *h.* 6in. Brazil, 1834. (B. M. 5664.)

G. zebrina. *See* **Nægelia zebrina.**

GESNERACEÆ. A natural order of herbs or shrubs, rarely trees, often growing from scaly tubers. Flowers showy; corolla variously coloured, often scarlet, violet, or blue, rarely white; calyx half adhering, five-parted; stamens two or four. Leaves opposite, usually wrinkled. There are about seventy-one genera and 700 species, natives of various parts of the world, chiefly the warmer regions of America. Sometimes the name *Cyrtandraceæ* is given to this order. Illustrative genera are: *Achimenes*, *Besleria*, *Cyrtandra*, *Gesnera*, *Gloxinia*, and *Streptocarpus*.

GESNERIA. *See* **Pentarhaphia.**

GETHYLLIS (an old Greek name, a diminutive of *gethuon*, a leek). ORD. *Amaryllideæ*. A genus of four or five species of pretty dwarf greenhouse bulbous perennials, from the Cape of Good Hope, allied to *Sternbergia*. Flowers white, deliciously fragrant; perianth tube long, cylindrical; limb of six segments, regular and spreading; scapes short, one-flowered. Leaves linear. The plants thrive best in a mixture of sandy loam and peat; they may be increased by offsets, or by seeds. But few of the species have been introduced.

G. ciliaris (fringed). *fl.* white; sepals ovate-oblong. June and July. *l.* linear, spiral, ciliated. *h.* 6in. 1788.

G. lanceolata (lance-shaped). *fl.* white; sepals lanceolate. June. *l.* lanceolate, flat. *h.* 9in. 1790.

G. spiralis (spiral). *fl.* white; sepals ovate-oblong. June and July. *l.* linear, spiral, smooth. *h.* 9in. 1780. (B. M. 1088.)

G. villosa (hairy). *fl.* white; sepals ovate-oblong. June and July. *l.* linear, filiform, spiral, villous. *h.* 9in. 1787.

GEUM (the old Latin name used by Pliny). Avens. Including *Sieversia*. Some of the species were formerly placed under a genus named *Adamsia*. ORD. *Rosaceæ*. A genus comprising about thirty species of hardy perennial herbs, widely diffused over all temperate and cold regions. Flowers yellow, red, or white, growing singly on long peduncles, at the ends of the stems or branches; petals five. Leaves variously dissected, the terminal lobe always the largest. Geums are of very easy culture, in moderately good soil, and in a well-drained situation. Most of the species are well adapted for growing in borders and in the rock garden. Propagated by seeds, or by division.

G. chiloense (Chiloe). *fl.* scarlet, sometimes copper-coloured, panicled, erect. Summer. *l.*, radical ones interruptedly pinnate; leaflets crenately serrated, the terminal one large, cordate, lobed, and crenated; cauline ones three-parted, deeply cut. Stem glandular. *h.* 1ft. to 2ft. Chiloe, 1826. Plant villous. (B. R. 1088, under name of *G. coccineum*.)

Geum—*continued.*

G. c. flore-pleno (double-flowered) is a very handsome form, with double flowers of a bright dazzling scarlet.

G. coccineum (scarlet).* *fl.* terminal, pedunculate, erect; calyx segments depressed, pubescent; petals purplish, orbiculate-reniform, clawed. *l.* green, inciso-crenate, veined, pilose; radical ones tufted, spreading, large, lyrate-pinnatifid, leaflets five or seven; upper cauline leaves simple, three-lobed, toothed. Stem solitary, herbaceous, erect; apex sub-corymbose, few-flowered. *h.* 6in. to 15in. Greece, Asia Minor, &c. (S. F. G. 485.)

G. elatum (tall).* *fl.* erect; petals golden-yellow, orbicular, sometimes notched or two-lobed; calyx lobes ovate-deltoid, or lanceolate, entire or toothed; peduncles long, slender. July. *l.*, radical ones sub-sessile, narrow, gradually dilated from the base to the rounded tip, pinnatisect; cauline ones small, with larger adnate-cut stipules. Stem very slender, twice or more forked, rarely simple. Himalaya Mountains, 1880. Hardy. (B. M. 6568.)

G. japonicum (Japanese). *fl.* yellow, erect. Summer. *l.* three to five-lobed, hairy. Stem flexuous, hairy. *h.* 1ft. to 2ft. Japan.

FIG. 103. GEUM MONTANUM, showing Habit and detached Single Flower.

G. montanum (mountain).* *fl.* yellow, erect. Spring. *l.* softly hairy, irregularly incised. *h.* 6in. to 12in. Europe. See Fig. 103.

G. pyrenaicum (Pyrenean).* *fl.* yellow, nodding; stems one to four-flowered. June. *l.* interruptedly pinnate; lower leaflets ovate, dentate, small. Stems erect, simple. *h.* 1½ft. Pyrenees, 1804. Plant pilose.

G. rivale (brook-loving).* Water Avens. *fl.* reddish, nodding; peduncles pilose, elongated; stems one to four-flowered. June. *l.* interruptedly and lyrately pinnate; leaflets obovate, biserrate; cauline leaves three-lobed. Stems erect, simple. *h.* 1ft. to 3ft. Cold and temperate regions (Britain).

G. strictum (upright). *fl.* yellow and striped, large, ascending. May to July. *l.* all interruptedly pinnate; leaflets ovate, toothed. *h.* 2ft. Europe, North America, 1778. Plant hairy.

G. triflorum (three-flowered).* *fl.*, calyx dark purple; petals white, purplish-red at extremity and margins, oblong, never spreading; scape purplish, 8in. to 12in. high, hairy, terminating in a three-flowered umbel; pedicels 3in. to 4in. long. July. *l.* radical, 4in. to 6in. (or more) long, oblong or obovate in outline, interruptedly pinnate; margins of pinnæ deeply serrated. North America. (B. M. 2858, under name of *Sieversia triflora.*)

GHERKIN. A small-fruited variety of *Cucumis sativa.*

GHOST MOTH, or **GHOST SWIFT.** *See* **Otter Moth.**

GIANT FENNEL. *See* **Ferula.**

GIBBOUS. Protuberant; more convex or tumid in one place than another.

GILIA (named in honour of P. S. Gilio, a Spanish botanist of the eighteenth century). Including *Fenzlia, Ipomopsis, Leptodactylon,* and *Leptosiphon.* ORD. *Polemoniaceæ.* A genus containing about sixty-five species of, for the most part, hardy annual herbs, natives of North-west, extra-tropical, and sub-tropical South America. Corolla

Gilia—*continued.*

infundibuliform and hypocrateriform, sometimes almost campanulate or rotate. Leaves variable. Gilias form very attractive subjects for beds or edgings, where they succeed without causing blanks by part of the plants dying away. They are readily raised from seed, sown in the open ground, in March or April. A rather light soil should be chosen, and positions selected according to the heights of different species.

G. achilleæfolia (Milfoil-leaved).* *fl.* purplish-blue; corymbs capitate, many-flowered, on very long peduncles. August. *l.* twice or thrice pinnate; leaflets linear-subulate. *h.* 1ft. California, 1833. (B. M. 5939.) There is an elegant variety with white flowers, and another with red ones.

FIG. 104. GILIA ANDROSACEA.

G. androsacea (Androsace-like).* *fl.*, corolla lilac, pink, or nearly white, with yellow or dark throat. August. *l.* opposite, narrow, palmatisect. *h.* 9in. to 12in. California. See Fig. 104. SYN. *Leptosiphon androsaceus* (under which name it is figured in B. M. 3491, B. R. 1710). There is a variety, *rosacea,* having a rose-red corolla, varying, however, into other hues. San Francisco. (B. M. 5863, under name of *Leptosiphon parviflorus rosaceus.*)

G. Brandegei (Brandegee's).* *fl.* several, in a short, racemose, leafy thyrse; corolla golden-yellow, trumpet-shaped; lobes oval and short. *l.* all pinnate, elongated linear in circumscription; leaflets small, numerous. Stem simple. *h.* 9in. to 12in. Colorado, 1878. Perennial. (B. M. 6378.)

G. capitata (headed).* *fl.* blue, sessile, disposed in dense heads on long peduncles. Summer. *l.* bipinnatifid; segments linear, cut. *h.* 1ft. to 2ft. North-west America, 1826. (B. M. 2698.)

G. densiflora (dense-flowered).* *fl.*, corolla tube lilac or nearly white, little (if at all) exserted beyond the calyx. June. *l.*, divisions filiform, somewhat rigid. California. SYN. *Leptosiphon densiflorus* (under which name it is figured in B. M. 3578; B. R. 1725).

G. dianthoides (Pink-like). *fl.* varying greatly in size and colour; corolla lilac or purplish, usually with darker or yellowish throat. July. *l.* narrow-linear. *h.* 2in. to 5in. California, 1855. A showy little plant. (B. M. 4876.)

G. inconspicua (inconspicuous). *fl.* somewhat crowded and sub-sessile, or at length loosely panicled; corolla violet or purplish, narrowly funnel-shaped, with proper tube shorter or slightly longer than the calyx. August. *l.* mostly pinnatifid or pinnately parted, or the lowest bipinnatifid, with short mucronate cuspidate lobes. *h.* 9in. to 12in. North America. (B. M. 2883.)

G. laciniata (cut-leaved). *fl.* purplish; peduncles axillary, solitary, one to three-flowered. July. *l.* pinnatifid; segments narrow-oblong, sinuated. *h.* 6in. to 12in. Chili, 1831.

G. liniflora (Flax-flowered).* *fl.* white, solitary, on long peduncles. Summer. *l.*, lower ones opposite, all sessile and palmately cut. *h.* 1ft. California, 1833. (B. M. 5895.)

G. micrantha (small-flowered).* *fl.* rosy-coloured, produced in great abundance, with a slender tube about 1½in. long. Summer. *l.* five to seven-parted; segments linear, acute. *h.* 9in. Plant more or less clothed with longish weak hairs. California, 1870. SYN. *Leptosiphon roseus.* There is a form, *aurea,* with golden-yellow flowers.

Gilia—*continued.*

G. multicaulis (many-stemmed). *fl.* blue; corymbs three to ten-flowered, on very long peduncles, scarcely panicled. Summer. *l.* somewhat bipinnate, smoothish; segments linear. *h.* 1ft. California, 1833. (B. M. 3440, and B. R. 1682, under name of *G. achilleæfolia.*)

G. tricolor (three-coloured).* *fl.*, corolla with an orange-yellow tube and centre, and the light purple or white of the margin separated by a circle of deep purple; corymbs three to six-flowered; panicles rather dense. June. *l.* bipinnate; segments linear-subulate. *h.* 1ft. California, 1833. (B. M. 3463; B. R. 1704.) There are several pretty varieties of this species, including white and violet-coloured ones.

GILIBERTIA (named after J. E. Gilibert, 1741-1814, a French botanist and physician). ORD. *Araliaceæ.* A genus comprising two or three species of ornamental evergreen shrubs, natives of tropical America. Flowers in terminal compound umbels. Leaves simple, entire. The species described below is, perhaps, the only one yet in cultivation. It thrives in a compost of sand, leaf mould, and light loam. Increased readily by cuttings, inserted in sand, in a gentle heat.

G. brasiliensis (Brazilian). *fl.* greenish. February and March. *l.* leathery, dark green. *h.* 4ft. to 6ft.

GILLENIA (named after Arnoldus Gillenius, a botanist of the seventeenth century). ORD. *Rosaceæ.* A genus comprising two species of hardy perennial herbs, natives of Northern United States. Flowers axillary and terminal, on very long peduncles. Leaves sub-sessile, trifoliolate; leaflets stalked, serrated. Gillenias are of easy culture, in a rather moist peaty soil, with partial shade. Increased readily by dividing the roots, in spring.

G. stipulacea (stipulaceous). *fl.* white. June. *l.* lanceolate, deeply incised. *h.* 1ft. to 2ft.

FIG. 105. GILLENIA TRIFOLIATA, showing Habit and detached Single Flower.

G. trifoliata (three-leaved).* *fl.* red to white, in panicles; calyx persistent, becoming red after the petals have fallen. June. *l.*, stipules linear, acuminated, entire. *h.* 1½ft. 1713. See Fig. 105 (B. M. 489, under name of *Spiræa trifoliata.*)

GILLIESIA (named in honour of Dr. Gillies, of Mendoza, in Chili). ORD. *Liliaceæ.* A genus comprising three species of bulbous herbs, natives of Chili. Flowers greenish, in terminal umbels; scape simple, leafless. Leaves few, radical, linear. *G. graminea*, the species best known to cultivation, thrives in a loam and peat soil, in a warm border; it requires a little protection in winter. Propagated by offsets.

G. graminea (grass-like). *fl.* green, inconspicuous, drooping; umbels divaricate, few-flowered; spathe two-valved, green, erect, persistent; scapes weak, terete, decumbent. September. *l.* radical, linear, channelled. *h.* 1ft. Valparaiso, 1825. (B. R. 992.)

GILLIFLOWER. A name corrupted from the French Giroflée; it is also written Gillyflower and Gilloflower. "The name was originally given, in Italy, to plants of the Pink tribe, especially the Carnation, but has of late years, in England, been transferred to several cruciferous plants. That of Chaucer, Spencer, and Shakespeare was, as in Italy, *Dianthus Caryophyllus;* that of later writers and gardeners, *Matthiola* and *Cheiranthus*" (Britten and Holland, "Dictionary of English Plant Names").

GINGER. The Ginger of commerce is the dried rhizomes of **Zingiber officinale** (which *see*). It is imported into this country in its dried and bleached state, from both the East and West Indies, Africa, and China; but Jamaica Ginger is considered the best. It is used both as a condiment and as a preserve.

GINGERBREAD PALM. *See* **Hyphæne thebaica.**

GINGERBREAD PLUM. *See* **Parinarium macrophyllum.**

GINGERWORTS. A popular name for the *Zingiberaceæ.*

GINKGO (the Japanese name). Maidenhair-tree. SYNS. *Salisburia, Pterophyllus.* ORD. *Coniferæ.* A monotypic genus, the species being a fine deciduous tree. It thrives thoroughly well in almost any garden soil in the South of England, but in the North requires the shelter of a wall. In some parts of France, it fruits freely. Propagated by imported seeds.

G. biloba (two-lobed).* *fl.* diœcious; male catkins slender, stalked; females in pairs, or solitary, on long footstalks. Spring. *fr.* edible, sweet, not produced until the tree has attained some size. *l.* three to five, handsome, fan-shaped, cloven about half-way from their summit, irregularly notched, thickened at the margin, smooth, striated on each side with numerous parallel nerves. Branches verticillate. *h.* 60ft. to 80ft. Northern China, 1754. (W. D. B. 168.) There are several forms of this handsome and interesting tree in the nurseries: *laciniata* has the leaves more deeply cut than usual; *pendula* is of weeping habit; and *variegata* has variegated foliage, but the colouring is not very marked.

GINSENG. The root of one or two species of *Panax.*

GIPSY MOTH (*Liparis dispar*). The specific name of this insect is derived from the fact that there is great

FIG. 106. MALE GIPSY MOTH.

disparity in the sexes. The male (Fig. 106) is dark brown or smoky, with zigzag darker markings and lighter shades;

FIG. 107. FEMALE GIPSY MOTH.

the antennæ are like feathers. The female (Fig. 107) is larger than the male; the wings are dingy or yellowish-white, with darker markings, as in the male, and a distinct black mark ❬ near the centre of the fore wing; the antennæ are simple. In both sexes the fringes are pale, with dark

Gipsy Moth—*continued.*

interspersions at the end of the wing-rays. The caterpillar is black, with yellowish marking, and a grey line down the back. Each segment has six tubercles, all emitting bristly hairs, black on the back and brown on the sides. It is believed that the Gipsy Moth is almost, if not quite, extinct as a British species; but, upon the Continent, the larvæ occasionally do considerable damage to fruit-trees by stripping them of their leaves. They may be collected by beating the branches over an inverted umbrella.

GITHAGO. Included under **Lychnis** (which *see*).

GLABROUS. Smooth; destitute of hairs.

GLADIATE. Sword-shaped; the same as Ensiform.

GLADIOLUS (diminutive of *gladius*, a sword; referring to the shape of the leaves). Corn Flag. ORD. *Irideæ.* This genus contains about ninety species of so-called "bulbous" plants, many of which are amongst the most popular of outdoor summer and autumn-flowering subjects. The geographical distribution is Central Europe, the Mediterranean region, West Asia and Africa — the headquarters of the genus being South Africa. The flowers are secund, spiked, borne on tall scapes, the colours being very varied; the perianth is sub-bilabiate, with a short curved tube. The leaves are all equitant and sword-shaped; and the corms have netted fibrous coats. Original species have long since been superseded by the very numerous and beautiful hybrids that are in cultivation. Many of the former are, however, very ornamental, and well worthy of retaining for pot culture in cool houses, or for mixed flower borders, in summer. Improvement in the Gladiolus is wholly due to the efforts of hybridisers, who took it in hand, first in France, some fifty years ago, and afterwards in this country, about the middle of the present century. Varieties that were subsequently, and those which are still annually, obtained, represent an extreme diversity in the colouring of the flowers. Some are pure white, others range from that colour to deep crimson, and include yellowish and purple shades, many being beautifully flaked and marked. Gladioli are propagated by seeds, which ripen and germinate pretty freely; and by numerous large and small bulbils, usually termed "spawn," that are found round the old corms, or on the ends of the

FIG. 108. GLADIOLUS CORM, showing Mode of Increase.

roots, in autumn (see Fig. 108). Seeds should be sown early in March, preferably in large pans or pots, where the young plants may be thinned and allowed to remain for the first season. The pans should first be placed in heat, and, as the seedlings appear, a light position and more air should be given, in order to gradually harden off for placing outside all the summer. If well attended to when growing, and afterwards thoroughly ripened in autumn, the young corms may be stored like larger ones, and many of them will flower the second

Gladiolus—*continued.*

year. For increasing stock of any one or more varieties, the small corms should be separated from those intended for flowering, and planted from 4in. to 6in. apart, in a warm border, about the middle of March. If watered, and allowed to grow for the summer, many of them will become large enough to flower the following year.

Cultivation. A deep rich soil, and a sheltered, sunny position, are requisite for attaining the best results. Plenty of manure may be intermixed with the soil, in the autumn, when trenching and other preparations for Gladioli should be commenced; but none should be applied in a fresh state at planting time, as it tends to cause decay in the corms, if coming in contact with them before growth commences. *Brenchleyensis* is an old sort, but still one of the best and most extensively grown. It increases rapidly and is of a good constitution, succeeding with telling effect when planted either in a bed or in small groups of about half-a-dozen, in various parts of mixed flower borders or shrubberies. If the planting of a portion is commenced early in March, and continued at intervals till the end of May, the flowering period may be similarly prolonged until late in the autumn. The corms should be inserted about 3in. deep, and 1ft. apart, if in beds; and a circular group may consist of four or five, in a space of 1ft. diameter. Each plant will require a stake before the flowering season arrives, to prevent injury from rough winds. In hot weather, plenty of water must be given, and a mulching of short manure is always beneficial as a preventative of undue evaporation. Before the appearance of severe frost, the corms should be lifted, with their tops intact, and laid in a cool, dry shed, to become ripened, when the tops may be cut off close down, and the corms placed in paper bags, until planting time. This specially refers to the South African species, and to all the finer hybrids; except in very dry sandy soils, it would be unwise to leave the corms of these in the ground throughout the winter. The South European species do not need any such attention. The large and small ones are best separated when storing; and the bags should be labelled according to the size or the variety contained in each.

Culture in Pots. Large-flowering Gladioli succeed in pots, if desired for summer or autumn decoration of greenhouses, &c. One large corm is sufficient for a 7in. pot, and successional batches may be inserted in rich soil, and grown in a frame where plenty of air can be admitted, or in a sheltered position outside. *G. Colvillei* and its white form, known as "The Bride," are amongst the most beautiful for pot culture. They succeed admirably, and may be had in full beauty in April and May, if gently forced. The corms are small, and do not require much root space. About five of them should be placed in a 5in. or 6in. pot, in autumn, and either covered for a time with ashes outside, as ordinary bulbs are, or placed in a cold frame from the first. When roots are formed, and growth begins, a few pots at a time should be successionally placed in a temperature of about 55deg. Each strong corm will produce two or more flower scapes, and, when these appear, a little higher temperature may be given, always selecting a situation exposed to light, and applying plenty of water to the roots. Later batches come on all right in a cold frame. *G. Colvillei* and *G. C. alba* succeed equally well with the larger-flowered varieties, when planted outside in summer. Any Gladiolus flowers expand well in water when they are far enough advanced to begin opening naturally. With a system specially adopted by exhibitors, the whole of the flowers in a spike are secured at one time by placing the latter in water at a certain stage, and encouraging the flowers to expand slowly in a cool place.

Gladiolus—*continued.*

Except where otherwise stated, the species enumerated below are natives of the Cape of Good Hope.

G. blandus (fair).* *fl.* white, with red markings, large; tube yellow, shorter than the spathe. June. *l.* ensiform, nerved. Stem 6in. to 2ft. high, three to ten-flowered. 1774. (B. M. 625.)

G. b. campanulatus (bell-shaped). A large and strong variety, with whitish-purple flowers. (B. M. 645.)

G. brachyandrus (short-stamened).* *fl.*, perianth bright pale scarlet, 2in. to 2½in. long; tube ½in. long; segments oblong, acute; spike nearly 1ft. long, eight to ten-flowered. July. *l.* four or five, near the base of the stem, strongly ribbed and margined, not more than 3in. long, about ½in. broad. *h.* 2ft. Tropical Africa, 1879. (B. M. 6463.)

G. byzantinus (Byzantine).* *fl.* red; corolla adscendent, nodding; spikes many-flowered. June. *l.* narrow, deep green. *h.* 2ft. Turkey, 1629. (B. M. 874.)

FIG. 109. GLADIOLUS CARDINALIS, showing Habit and detached Single Flower.

G. cardinalis (cardinal).* *fl.* fine scarlet; corolla with large white rhomboidal spots, erect; limb campanulate. July and August. *l.* ensiform, many-nerved. Stem 3ft. to 4ft. high. 1789. See Fig. 109. (B. M. 135.)

G. Colvillei (Colville's).* *fl.*, perianth tubular; limb bright red, with pale purple markings, spreading. July. *l.* linearly-ensiform, acute, strongly nerved in the middle on both sides. Stem slightly flexuose, 1½ft. high, leafy, slightly angular, glaucous. A garden hybrid between *G. cardinalis* and *G. tristis.* (S. B. F. G. 155.)

G. C. alba (white) is a charming white-flowered form; it is very largely cultivated for decorative purposes by some of the plant growers—who supply Covent Garden—under the name of The Bride.

G. communis (common). *fl.* bright rose, sometimes white; tube short; upper segments approaching, larger than the lower ones, the three internal ones almost equal; spike unilateral, six to eight-flowered. Summer. *h.* 1½ft. to 2ft. South Europe, 1596. (B. M. 86 and 1575.)

G. Cooperi (Cooper's). *fl.*, perianth tube yellowish-green, funnel-shaped; limb yellow, closely lined with purplish-red; expanded spike 1ft. long, eight to twelve-flowered. September. *l.* radical, about six, erect, ensiform, glabrous, acuminate, 1ft. to 1½ft. long, 1in. broad, strongly ribbed. *h.* 2ft. 1862. (B. M. 6202.)

G. cruentus (bloody).* *fl.* brilliant scarlet, yellow-white and speckled with red at base of limb, broadly campanulate, 4in. in diameter; two lower lateral segments of perianth marked with white; spike 6in. to 10in. long, dense-flowered. September. *l.* 1ft. to 1½ft. long, linear-ensiform. *h.* 2ft. to 3ft. Natal, 1868. (B. M. 5810.)

G. cuspidatus (abruptly-pointed).* *fl.* varying much in colour, usually beautifully marked with purple and red in the lower segments; tube filiform, straight. May and June. *l.* ensiform, generally shorter than the stem. Stem 2ft. to 3ft. high. 1795. A magnificent plant. (B. M. 582.)

G. c. ventricosus (swelling). A variety with reddish flowers, which are not so upright, and with a shorter tube and less inflated spathe than the type. May and June. (B. M. 591, under name of *G. carneus.*)

G. dracocephalus (dragon's head). *fl.*, perianth yellowish, closely striated with dull red-purple, about 2in. long and broad; lower segments bright green, spotted purple; spikes erect, five to seven-flowered. August. *l.* 6in. to 12in. long, 1in. to 1½in. broad, pale green. Stem 16in. to 18in. high, stout, terete. 1871. (B. M. 5884.)

G. floribundus (bundle-flowered).* *fl.* four to six, large and upright; limb segments varying from dirty-white with a broad livid purple longitudinal fillet, to bright flesh-colour with a

Gladiolus—*continued.*

lively red fillet; anthers dark violet. May. *l.* strongly and many-nerved. Stem about 1ft. high, flower-bearing nearly to its base. 1788. (B. M. 610.)

FIG. 110. HYBRIDS FROM GLADIOLUS GANDAVENSIS.

G. gandavensis (Ghent). *fl.* rich crimson, marked with yellow. Summer. According to Van Houtte, this is a hybrid between *G. psittacinus* and *G. cardinalis;* whilst Herbert believes it to have originated between *G. psittacinus* and *G. oppositiflorus.* SYN. *G. gandiensis.* See Fig. 110. (P. M. B. xi., p. 27.)

G. gandiensis (Ghent). A synonym of *G. gandavensis.*

G. gracilis (slender). *fl.* white, variable, similar to those of *G. recurvus.* March and April. *l.* thick and flat, with a deep square groove on both sides. Stem 1ft. to 3ft. high. 1800. (B. M. 562.)

G. grandis (large). *fl.* reddish-brown to whitish; segments of flower longer than the throat. May and June. *l.* linear-ensiform, three-ribbed on each side. *h.* 1½ft. 1794. (B. M. 1042, under name of *G. versicolor.*)

G. hastatus (halbert-shaped). *fl.*, perianth pinkish-white, reddish on the outside, 2½in. high. April and May. *l.* radical. *h.* 1ft. 1816. This species is nearly allied to *G. blandus.* (B. M. 1564.)

G. Papilio (butterfly-flowered).* *fl.* very pale purple, marked with rich dark purple and golden-yellow; spike slender, 1ft. or more long. *l.* narrow-ensiform, 2ft. to 3ft. long; apex acuminate. *h.* 3ft. 1866. (B. M. 5565.)

G. plicatus (folded). A synonym of *Babiana stricta sulphurea.*

FIG. 111. GLADIOLUS PSITTACINUS, showing Habit and detached Single Flower.

G. psittacinus (parrot-like).* *fl.*, corolla tube greenish, with purple streaks; limb campanulate, spreading, rich scarlet (in bud purplish-blood colour), lined and spotted with yellow; spikes 1ft. or more long, ten to twelve-flowered. Summer and autumn. *l.* distichous; lower ones 1ft. or more long. Stem 3ft. high. South-eastern Africa, &c. See Fig. 111. (B. M. 3032.)

G. pudibundus (modest). *fl.* brilliant rose, large, about ten in number, in a distichous spike; spathes two-valved; anthers purple. *l.* broadly ensiform, acuminate, ribbed, pale green. Stem 2ft. to 3ft. high. A garden hybrid between *G. blandus* and *G. cardinalis.* (S. B. F. G. ser. ii. 176.)

G. purpureo-auratus (purple-and-golden).* *fl.* almost bifarious; perianth limb golden-yellow, with a large purple blotch on the two lower segments. August. *l.* 6in. to 9in. long, ¾in. broad, acuminate, erect. *h.* 3ft. to 4ft. 1872. (B. M. 5944.)

Gladiolus—*continued.*

G. Quartinianus (Quartin Dillon's). *fl.* yellow, flushed and spotted with scarlet; spathes herbaceous, lanceolate, about 2in. long; spike about six-flowered. August. *l.* linear-ensiform, 1ft. or more long, rigid, prominently nerved. *h.* 3ft. to 4ft. Tropical Africa, 1883. (B. M. 6739.)

G. recurvus (recurved). *fl.* yellow, thickly dotted with blue, which colour eventually predominates, violet-scented; spathes about half the length of the corolla, much longer than the tube. April and May. *l.* three, outer one nearly the height of the stem. Stem 1ft. to 3ft. high, slender, erect. Root sheath white, mottled with purplish-brown. 1758. The flowers of this species are the most exquisitely scented of the whole genus. (B. M. 578.)

G. sambucinus (Elder-scented). A synonym of *Babiana sambucina.*

G. Saundersii (Saunders').* *fl.* crimson, spotted with white, six to twelve, rather remote; perianth 3in. to 3½in. in diameter; anthers yellow. Autumn. *l.* 2ft. to 3ft. long, ⅓in. to ¾in. broad, strongly nerved. *h.* 2ft. to 3ft. 1871. (B. M. 5873.)

G. segetum (cornfield). *fl.* rose-coloured, in two rows; lower segments unequal, each with a long, narrow white spot. *h.* 2ft. South Europe, 1596. (B. M. 719.)

G. sericeo-villosus (shaggy-stemmed). *fl.* a very peculiar yellow-green, tinged with pale yellowish-brown; spikes many-flowered; corolla limb tinged with red, campanulate; spathes shaggy. June. *l.* linear-ensiform, striped. Stem with shaggy-silky clothing. *h.* 3ft. to 4ft. 1864. (B. M. 5427.)

G. sulphureus (sulphur). A synonym of *Babiana stricta sulphurea.*

G. tristis (sad). *fl.* cernuous, 2in. to 3in. deep; corolla tube funnel-shaped, rather shorter than the divisions, the groundwork yellow, the three upper segments minutely spotted all over, both externally and internally, with small reddish-brown dots, the three lower ones narrower and spotted only on the outer half. July. *l.* with long cylindrical spathes below, almost tetragonal. *h.* 1ft. Natal, 1745. (B. M. 1098; Ref. B. 23.)

G. vittatus (striped). *fl.* pink, with darker stripes; anthers purple; corolla erect, funnel-shaped. May. *l.* ensiform. Stem 8in. to 12in. high, simple or branched. 1760. (B. M. 538, under name of *G. undulatus var.*)

Varieties. Named collections are expensive, and not largely grown, unless they are required for exhibition. The subjoined list includes a selection of new and older varieties, of varied colours, that are amongst the best for this purpose, although it contains only a few compared with the large number offered for sale by nurserymen. Seedlings are now very good, if obtained from a reliable source, and answer for purposes of decoration almost equally as well as named ones, excepting the well-known *Brenchleyensis* and *gandavensis* varieties, from which the majority of those in cultivation have descended, and which are now tolerably cheap, and well worth growing on an extensive scale.

AGDESTES, white, violet blotch on lower petal, large, handsome; AGNES MARY, white, shaded pale lilac, purplish mark on lower petal; ANNA, cherry, striped carmine, white ground; ASTREA, scarlet-crimson, with pale rose stripe, white centre; BRENCHLEYENSIS, vermilion-scarlet, large spikes, one of the best grown; CALLIPHON, rose, streaked brighter colour, light centre; CAPTAIN BOYTON, red, bluish centre, white spots on lower petals; COUNTESS OF PEMBROKE, rich purple, flaked lake; DAMIA, white, tinged pale purple or lilac; DELICATISSIMA, white, shaded lilac; DR. BENSON, light scarlet, purple centre; DR. HOGG, mauve, suffused rose, centre white; DUKE OF TECK, blush-white, rosy-red centre, fine; EARL OF AIRLIE, orange-red, crimson scarlet mark on lower petal; ELECTRA, pale rosy-purple, violet stripe on lower petal, fine, well formed; FELICIEN DAVID, rosy-cerise, striped carmine; HELUM, violet-purple, deep purple flake; HESPERIA, orange-scarlet, purple throat; HOGARTH, white, lower part flaked lilac-purple; LADY BRIDPORT, blush, striped carmine, extra large and fine; LADY CARRINGTON, pale lilac, white centre, very fine; LADY LEIGH, white, tinted rose, flaked pale purple; LA FRANCE, pale flesh-colour inside, flaked rosy-purple outside, lower petals pu[illegible] tipped yellow; L'ALSACE, pale canary, lower petal blotched [illegible] carmine, very pretty; LEMOINEI, creamy, blotched maroon-crimson, good decorative variety; LORD BYRON, scarlet, spot white; LORD POWIS, white, bordered rose, flaked red; MADAME VILMORIN, bright rose, white centre; MARCIANUS, orange-red, striped carmine, fine; MARECHAL BAZAINE, scarlet, white centre, and flake on each petal; MARS, deep scarlet; MASQUE DE FER, bronzy red, lower segments darker, velvety, yellow spot in centre; MR. DERRY, pale lilac-purple, veined rosy purple, fine; MR. THORNTON, purplish-crimson, veined red; MRS. J. EYTON, white, shaded and striped lilac-rose; MRS. LAXTON, rosy-red, ivory-white centre; NAPOLEON III., scarlet, blotched white; NEOCLES, white, purple on the lower petals; PICTUM, salmon-scarlet, flaked carmine, fine; QUEEN MARY, white, purplish-violet stripe on lower petal, fine; REMBRANDT, brilliant-scarlet, good; REMUS, bright rosy-purple, flaked crimson; REV. M. J BERKELEY, orange-scarlet, flaked carmine, pure white centre; RICHARD DEAN, light crimson, carmine stripe on lower petal; SIR STAFFORD NORTHCOTE, salmon-red, flaked crimson; SOLFATERRE, yellow, spotted carmine; TELAMON, flesh-colour, flaked carmine, white throat; THOMAS METHVEN, violet, tinted rose; UNA, scarlet, white centre, petals flaked white, fine; VICTORY, crimson, flaked purple centre, fine; W. E. GUMBLETON, rosy-purple, striped carmine, maroon spots, fine decorative variety; YELLOW KING, yellow, orange centre, flaked carmine.

GLADWYN. *See* **Iris fœtidissima.**

GLANDULAR. Covered with hairs, bearing glands upon their tips.

GLANDULOSE. Bearing glands.

GLANDULOSO-SERRATE. Having serratures tipped with glands.

GLAREOSE. Growing in gravelly places.

GLASS. The quality and thickness of Glass are important considerations in the construction of houses for horticultural purposes. Since the value of light for plants has been more fully recognised, and Glass of good quality has become much cheaper, improvements have been generally made which entirely supersede the old system of inserting very small panes. Various sorts of Glass have been tried at different times, but none is found to equal good sheets of not less than 21oz. or 24oz. to the square foot, where the panes are intended to be large. It is not advisable to have the latter more than 3ft. long for any plant structure, on account of their weight and the expense of repairs, should any breakage occur. Opaque corrugated Sheet-glass, and rough or unpolished Plate-glass, have each been tried for various plant houses, but have been found unsuitable on account of admitting insufficient light in dull weather, and also as not affording the requisite shade for tender plants in summer without additional covering being applied. Green-tinted Glass is sometimes used where a subdued light is desirable, such as a house devoted to ferns. This does not prevent the necessity of giving other shade in addition on bright summer days. Excepting for frame sashes or small panes in houses, Glass that only weighs 16oz. to the square foot should not be used for glazing any framework that is exposed to hail or snow storms and other rough weather. Curvilinear roofs require specially bent Glass for certain parts, which, however, costs nearly double the price of the ordinary kind, and consequently renders repairs to such structures considerably more expensive. If Glass is of bad quality, the destruction, by burning, of the tender foliage of plants beneath is almost certain. This is caused by numerous defects in the Glass acting as foci.

GLASSWORT. *See* **Salicornia.**

GLASTONBURY THORN. *See* **Cratægus Oxyacantha præcox.**

GLAUCESCENT. Having something of a bluish-green, hoary, or sea-green appearance.

GLAUCIUM (from *glaukos*, greyish-green; referring to the hue of the leaves). Horned Poppy. ORD. *Papaveraceæ.* A genus comprising five or six species of hardy, ornamental, glaucous, annual or biennial herbs, chiefly confined to the Mediterranean region, one being a native of Britain. Flowers yellow or crimson, solitary. Leaves lobed or dissected. Glauciums are of easy culture in any good garden soil. They may be propagated by seeds, sown in April or May, in the open ground. The seedlings, when large enough to handle, should be transferred to their flowering quarters.

G. corniculatum (horned). A synonym of *G. phœniceum.*

G. flavum (yellow).* *fl.* bright yellow, large. June to August. Pod nearly 1ft. long. *l.*, radical ones numerous, stalked, pinnatifid, hairy. *h.* 1ft. to 2ft. Europe (Britain), North Africa, and West Asia. Whole plant glaucous. SYN. *G. luteum.* (Sy. En. B. 66.)

G. luteum (yellow). A synonym of *G. flavum.*

Glaucium—*continued.*

G. phœniceum (purple).* *fl.* crimson, with a black spot at the base of each petal. June. *l.* oblong, pinnatifid, hairy. *h.* 9in. England (probably naturalised). SYN. *G. corniculatum.* (Sy. En. B. 65.)

GLAUCOUS. Covered with a fine bloom.

GLAUX (the name given by Dioscorides to another plant; from *glaukos*, greyish-green). Black Saltwort; Sea Milkwort. ORD. *Primulaceæ.* A pretty little herbaceous perennial, rarely seen in gardens. It thrives in a moist sandy soil, and may be propagated by seeds.

G. maritima (sea). *fl.* of a pale pink colour, not two lines long, solitary, nearly sessile and axillary; corolla wanting; calyx deeply five-lobed. Summer. *l.* small, mostly opposite, sessile, ovate, oblong or almost linear, entire. *h.* 3in. to 6in. Europe (Britain), North and West Asia, and North America, on sands, salt-marshes, and muddy places, near the sea. (Sy. En. B. 1150.)

GLAZING. Numerous systems of Glazing have, of late years, been invented and patented, all being chiefly directed against the use of putty, and professing to offer advantages over the ordinary method, such as cheapness in construction, durability, the admission of additional light, and special facilities for repairing broken glass. Although some of these methods are largely adopted, and answer well in the case of extensive glass buildings, their use for horticultural purposes is by no means general. One of the best patent systems introduced is that known as Rendle's, in which the panes of glass are fitted at the top and bottom into horizontal grooves formed of bent zinc, and are slightly lapped on each other at the sides. The zinc grooves are made to conduct the water down the roof from the outside, and also that caused by condensation underneath. This renders the structure remarkably free from drip inside, which is an important consideration. No putty is used, and the plan answers equally well either with straight or curvilinear roofs, the glass being kept in place by indiarubber wedges. Various other modes are recommended by different makers, some having strips of felt along the sides of the panes, and a metal ridge on each rafter, screwed on the felt sufficiently close to hold all firmly underneath. The use of putty is requisite with sashes that are movable, either as ventilators or for covering frames, to prevent the glass shaking out or becoming displaced. In Glazing, the panes may vary in size, according to the dimensions of the house or pit. Unless the roof be very flat, the laps should not exceed ¾in., and they should be made as airtight as possible, each pane being secured in position before the putty is put on by small pieces of zinc made for the purpose. The larger the panes are, the more light do they admit; but a length of 2½ft. or 3ft. must be an outside limit, with a width not much exceeding 1ft. Great pressure is put on the surface of glass houses by rough winds, and by snow in winter; and, in order to withstand this, the quality of the glass and proper Glazing must be insured in the first instance.

GLAZIOVA. Included under **Cocos** (which *see*).

GLECHOMA. Now included under **Nepeta** (which *see*).

GLEDITSCHIA (named after Gottlieb Gleditsch, of Leipsic, 1714-1786, Director of Botanic Gardens at Berlin). SYN. *Gleditsia.* ORD. *Leguminosæ.* A genus comprising about half-a-dozen species of ornamental, mostly hardy, deciduous trees, inhabiting temperate or sub-tropical Asia and North America (one of them tropical African). Flowers greenish, disposed in spikes. Leaves abruptly pinnate and bipinnate on the same tree. Branches supra-axillary, frequently converted into branched spines. The species are of easy culture in almost any soil. Propagated by seeds, obtained from their natural habitats, and sown in March, about 1in. deep.

G. horrida (horrid). A synonym of *G. sinensis.*

G. monosperma (one-seeded). Water Locust. *fl.* greenish. Summer. *l.*, leaflets ovate-oblong, acute; spines slender, few, usually trifid. *h.* 30ft. to 40ft. United States, 1723.

Gleditschia—*continued.*

G. sinensis (Chinese). *fl.* greenish. Summer. *l.*, leaflets ovate-elliptic, obtuse; spines robust, conical, rameal ones simple or branched, cauline ones in fascicles, branched. *h.* 30ft. to 50ft. China, 1774. SYN. *G. horrida.*

G. triacanthos (three-spined).* Honey Locust. *fl.* greenish. Summer. *l.*, leaflets linear-oblong, lucid; spines robust, compressed at the base, but cylindrically conical at the apex, simple or trifid. *h.* 30ft. to 50ft. United States, 1700. There are several varieties of this fine tree, including an unarmed one, also one with a pendulous habit. (W. D. B. ii. 138.)

GLEDITSIA. A synonym of **Gleditschia** (which *see*).

GLEICHENIA (named in honour of W. F. Gleichen, 1717-1783, a German botanist). ORD. *Filices.* A genus comprising about thirty species of ornamental stove and greenhouse ferns. Caudex mostly creeping. Fronds rarely unbranched, generally dichotomously divided; pinnæ deeply pinnatifid, with the segments small and concave. Sori of few (usually two to four) sessile capsules, situated on a lower exterior veinlet. For general culture, *see* **Ferns.**

G. acutifolia (acute-leaved). A synonym of *G. quadripartita.*

G. Bancroftii (Bancroft's). A synonym of *G. longissima.*

G. bifurcata (twice-forked). A synonym of *G. flagellaris.*

G. bracteata (bracteate). A synonym of *G. flagellaris.*

FIG. 112. GLEICHENIA CIRCINATA.

G. circinata (circinate).* *fronds*, lobes of the pinnæ ovate or sub-rotund, more or less glaucous beneath, the margins slightly recurved; branches and rachis glabrous, or more or less pubescent. Capsules three to four, superficial. Australia. Stove. See Fig. 112. SYNS. *G. microphylla, G. speluncæ.* The variety *semi-vestita* has the rachises and young fronds very paleaceo-pubescent. See Fig. 113.

G. cryptocarpa (hidden-fruited). *fronds* proliferous, coriaceous, deep yellow or yellow-brown when dry; branches dichotomously flabelliform; pinnæ broad-lanceolate, sub-erect and compact, 4in. to 5in. long, 1in. broad, pectinato-pinnatifid; segments narrow-linear, strongly veined, the margins singularly revolute, concealing the sori. Capsules one to four in a sorus. *h.* 3ft. Chili, 1865. Greenhouse.

C. Cunninghami (Cunningham's). *fronds* often proliferous, coriaceous; branches dichotomously flabelliform, glaucous beneath, hairy; pinnæ linear-lanceolate, acuminate, 4in. to 6in. long, ½in. to 1in. broad; segments linear, acute. Capsules two to four in a sorus. New Zealand. Greenhouse. (H. S. F. i. 6B.)

G. dicarpa (two-fruited).* *fronds*, lobes of the pinnæ round, sub-hemispherical, very fornicate. Capsules two, concealed within the almost slipper-shaped lobes, and mixed with ferruginous, paleaceous hairs, which often extend to the rachis. Australia. A variable stove species. (H. S. F. i. 1C.) The variety *alpina* is generally smaller and more compact, rachis and young shoots ferruginous with paleaceous wool. SYN. *G. hecistophylla.* (H. S. F. i. 2B.) Another elegant variety, introduced in 1879, is *longipinnata*, in which the fronds are longer than those of the type, and the growth is exceedingly graceful.

G. dichotoma (forked).* *sti.* zigzag, repeatedly di- or trichotomous, the ultimate branches bearing a pair of forked pinnæ, about 8in. long and 2in. wide; segments never decurrent, glau-

Gleichenia – *continued.*

cous beneath. Tropical regions. Stove. SYNS. *G. ferruginea*, *G. Hermanni*, *G. rufinervis*, and many others.

G. excelsa (tall). A synonym of *G. longissima*.

G. ferruginea (rusty). A synonym of *G. dichotoma*.

G. flabellata (fan-shaped). *fronds* very proliferous; branches dichotomously flabelliform; pinnæ ascending, about 6in. long, 1in. to 2in. broad, lanceolate; segments linear. Australia, &c., 1823. Greenhouse.

G. flagellaris (whip-like).* *fronds*, branches glabrous, repeatedly dichotomous, copiously foliaceous, glabrous, often glaucous beneath, sub-coriaceo-membranaceous; pinnæ erecto-patent or divaricating, extremely variable, broad or narrow, or linear-lanceolate, 5in. to 1ft. and more long; segments ½in. to 2in. and more long, linear, sometimes ferrugineo-tomentose at the base beneath. Capsules two to four. Mauritius and Bourbon, Madagascar; abundant in Java and Malay Islands. Stove. SYNS. *G. bifurcata*, *G. bracteata*, *G. lævigata*, *G. plumæformis*.

G. furcata (forked). A synonym of *G. pubescens*.

G. gigantea (gigantic). A synonym of *G. longissima*.

G. glauca (glaucous). A synonym of *G. longissima*.

G. hecistophylla (smallest-leaved). A synonyn of *G. dicarpa alpina*.

G. Hermanni (Hermann's). A synonym of *G. dichotoma*.

G. lævigata (smooth). A synonym of *G. flagellaris*.

G. longipinnata (long-pinnated). A synonym of *G. pubescens*.

G. longissima (longest).* *sti.* stout, forked; branches very long; pinnæ numerous, 4in. to 8in. long, 1in. to 2in. broad, deeply pinnatifid; segments linear, acuminated, or oblong, China and Japan. Greenhouse. SYNS. *G. Bancroftii*, *G. excelsa*, *G. gigantea*, *G. glauca*. (H. S. F. i. 3B.)

FIG. 113. GLEICHENIA CIRCINATA SEMI-VESTITA.

G. Matthewsii (Matthews's). A synonym of *G. pubescens*.

G. microphylla (small-leaved). A synonym of *G. circinata*.

G. pectinata (combed).* *sti.* zigzag, branched; branches bearing one to three pairs of forked divaricating pinnæ; segments never decurrent, frequently glaucous beneath. *sori* of eight to ten capsules. Tropical America, 1824. Very distinct. Stove.

G. plumæformis (feather-formed). A synonym of *G. flagellaris*.

G. pubescens (downy).* *sti.* and rachises often woolly; branches of the frond repeatedly dichotomous, leafy; pinnæ 5in. to 2ft. long, 1in. to 2in. broad, pectinato-pinnatifid, clothed with cobwebby pubescence; segments spreading, linear. Capsules two to five. Tropical America. Stove. SYNS. *G. furcata*, *G. longipinnata*, *G. Matthewsii*, *G. tomentosa*.

G. quadripartita (quadripartite). *fronds* coriaceous, black when dry, rufous-brown beneath, not proliferous, only once-forked; each branch dichotomously flabelliform; pinnæ lanceolate, acuminate, falcately curved, pectinato-pinnatifid, 4in. to 6in. long, 1in. to 1½in. broad; lobes narrow-linear, sub-falcate, sharply acute, the margins a little recurved. Capsules one to three in a sorus. Straits of Magellan. Greenhouse. SYN. *G. acutifolia*.

G. rufinervis (red-nerved). A synonym of *G. dichotoma*.

G. rupestris (rock).* *fronds* 2ft. to 6ft. long; lobes of pinnæ rounded or obtusely sub-quadrangular, coriaceous; margins thickened and recurved, sub-glaucous beneath. *sori* of three or four capsules, superficial. Australia, 1860. Greenhouse. Perhaps only a variety of *G. circinata*.

G. speluncæ (cavern). A synonym of *G. circinata*.

G. tomentosa (tomentose). A synonym of *G. pubescens*.

GLEICHENIACEÆ. A group or sub-order of *Filices*.

GLOBBA (native Molucca name). SYN. *Sphærocarpus*. ORD. *Zingiberaceæ*. A genus of about twenty-four species of pretty stove herbaceous perennials, natives of India and the Malayan Archipelago. Flowers yellow or pinkish, very curious-looking; calyx three-cleft, tubular; corolla with a slender tube. Globbas are of easy culture in a warm, moist stove; and may be readily increased by dividing the roots.

G. atro-sanguinea (dark red).* *fl.* yellow, with scarlet bracts, disposed in dense terminal racemes. In blossom the greater part of the year. *l.* alternate, ovate-lanceolate, acuminate, deep glossy green. Stems about as thick as a goose quill, much crowded, 1ft. to 1½ft. long, gracefully arching on all sides. Borneo, 1881. An elegant plant. SYN. *G. coccinea*. (B. M. 6626.)

G. coccinea (scarlet). A synonym of *G. atro-sanguinea*.

G. Schomburgkii (Schomburgk's).* *fl.* golden-yellow, with a bright orange-red base to the lip; panicle drooping; lip narrowly cuneate, with a broad, retuse, truncate end. August. *l.* elliptic-ovate or lanceolate, with slender acuminate tips, contracted into a short petiole above the vagina. Stems tufted, 6in. to 12in. high. Siam, 1864. (B. M. 6298.)

G. sessiliflora (sessile-flowered). *fl.* yellow; spike whorled; lateral segments of corolla longest; bracts lanceolate, withering. August. *l.* lanceolate, acuminate. *h.* 1½ft. Pegu, 1807. (B. M. 1428.)

GLOBE AMARANTH. *See* **Gomphrena globosa.**

GLOBE FLOWER. *See* **Trollius.**

GLOBE MALLOW. *See* **Sphæralcea.**

GLOBE THISTLE. *See* **Echinops.**

GLOBOSE, GLOBULAR. Round or spherical.

GLOBULARIA (from *globulos*, a small round head; in allusion to the form of the capitate flower). ORD. *Selagineæ*. A genus comprising twelve species of hardy or greenhouse perennial herbs, shrubs, or sub-shrubs, inhabiting the Mediterranean region, &c. Flowers collected upon a common receptacle, surrounded by a many-leaved involucre. Leaves radical or alternate, coriaceous, obovate-oblong or lanceolate, entire or argutely sparingly toothed. Globularias are pretty plants for the rock garden, in a moist, free soil; they may also be grown in the margins of borders. Propagated by seeds, or by division.

G. Alypum (Alypum).* *fl.-heads* pale, terminal. August and September. *l.* lanceolate, three-toothed and entire. Stem shrubby. *h.* 2ft. South Europe, 1640. Greenhouse shrub. See Fig. 114. (Fl. Ment. 34.)

G. cordifolia (heart-leaved). *fl.-heads* blue, small, globular, solitary, terminal. Summer. *l.* petiolate, obovate cuneate, emarginate. Stem shrubby, prostrate, much branched. Europe, Western Asia, 1633. Hardy sub-shrub.

FIG. 114. FLOWER-HEAD OF GLOBULARIA ALYPUM.

G. longifolia (long-leaved). *fl.-heads* white, axillary, sub-sessile, solitary. July and August. *l.* lanceolate, linear, entire. Stem shrubby. *h.* 3ft. Madeira, 1775. Greenhouse. (B. R. 685.)

G. nana (dwarf). *fl.-heads* bluish, globular, nearly ½in. in diameter. Summer. *l.* radical, fleshy, narrowly obcordate-cuneate. Stem woody, creeping, prostrate. South Europe, 1824. Hardy herb.

G. nudicaulis (naked-stemmed).* *fl.-heads* blue, larger than

Globularia—*continued.*

those of *G. cordifolia*. Summer. *l.* radical, oblong, crenate obtuse. Stems herbaceous. *h.* 6in. South Europe, 1629. Hardy herb.

G. trichosantha (hairy-flowered). *fl.-heads* light blue, large. Summer. *l.*, radical ones spathulate, sometimes tridentate; cauline ones linear, mucronate. Stem herbaceous, leafy. *h.* 6in. to 8in. Asia Minor. Plant glaucescent. Hardy herb.

G. vulgaris (common).* *fl.-heads* bright blue, dense, terminal; involucre of nine to twelve imbricated leaflets. Summer. *l.*, radical ones spathulate, emarginate, or shortly tridentate; cauline ones small, lanceolate. Stems herbaceous, erect. *h.* 6in. to 12in. Europe, 1640. Hardy herb. (B. M. 2256.)

GLOBULARIEÆ. A synonym of *Selagineæ*.

GLOBULEA. Included, by Bentham and Hooker, under *Crassula*.

GLOMERATE. Gathered into round heaps or heads.

GLONERIA. Included under **Psychotria** (which *see*).

GLORIOSA (from *gloriosus*, full of glory; referring to the handsome flowers). SYNS. *Clynostylis, Methonica.* ORD. *Liliaceæ*. A genus comprising three species of very ornamental, usually stove bulbs. Flowers axillary, in racemes on the ends of the stems, which bear leaves remarkable in having tendril-like apices. Propagation is effected by seeds and by offsets. Seeds are best inserted singly, in small pots, in January, using a light sandy soil, and plunging in bottom heat. Offsets should be carefully removed from old bulbs when starting them in spring, as the roots are very brittle, and are easily injured if division is attempted at other times. Good drainage is always essential, and an open soil, composed of loam and peat in about equal proportions, is recommended. The bulbs should be carefully repotted in February, and then started in a temperature of about 70deg. Plenty of heat and moisture are necessary in summer; but, as the growth ripens, water should be gradually withheld. During winter, the soil must be kept quite dry, and the pots laid on their sides in a warm place. Exposure to cold, when at rest, is a point specially to be avoided. The winter treatment applies alike to seedlings and established bulbs. Gloriosas are frequently very slow-growing, and are impatient of root disturbance on account of their brittleness. The seasons of growth and complete rest in a warm place, are most important considerations in their culture.

FIG. 115. FLOWERING BRANCH AND SINGLE FLOWER OF GLORIOSA SUPERBA.

G. superba (superb).* *fl.* deep rich orange and red; perianth segments narrow, deeply undulate and crispate, erect. Summer. *h.* 6ft. Tropical Asia and Africa, 1690. See Fig. 115. (A. B. R. 129; B. R. 77.)

G. virescens (greenish). *fl.* deep orange and yellow; perianth segments spathulate; margins not crispate, and but slightly undulated. *h.* 4ft. Mozambique, 1823. (B. M. 4938.) *G. Plantii* is the form with reddish-yellow flowers. The variety *grandiflora* (*Methonica grandiflora*, B. M. 5216) is a tropical African form, with much larger flowers than the type.

GLORY PEA. *See* **Clianthus.**

GLOSSARRHEN. A synonym of **Schweiggeria.**

GLOSSASPIS. A synonym of **Glossula.**

GLOSSOCOMIA. A synonym of **Codonopsis.**

GLOSSODIA (from *glossa*, a tongue, and *eidos*, like; alluding to the tongue-like appendage within the flower). ORD. *Orchideæ*. A genus comprising about four species of greenhouse terrestrial orchids, limited to Australia. Flowers purple or blue, erect, one or two on an erect scape, leafless except an empty sheathing bract at or below the middle, and a similar one under each pedicel; lip sessile, undivided, not fringed. Leaf solitary, oblong or lanceolate, from within a scarious sheath close to the ground. Glossodias thrive in sandy loam and peat, and require but little water when in a dormant state. Propagated by division.

G. major (larger). *fl.* blue; sepals and petals oblong-lanceolate, obtuse, not blotched; lip ovate, broad, biconvex and pubescent with white hairs in the lower half, upper half lanceolate, blue and glabrous. June. *l.* oblong or lanceolate, 1in. to 2in. long. Tuber ovoid. 1810. SYN. *Caladenia major*.

G. minor (smaller). *fl.* blue; sepals and petals oblong-lanceolate; lip about one-third the length of the sepals, broad, biconvex and pubescent in the lower half, the spreading upper half triangular, acute, flat, glabrous. June. *l.* lanceolate, the small sheathing bract usually green. 1810. SYN. *Caladenia minor*.

GLOSSULA (from *glossa*, a tongue; in reference to the tongue-like segments of the labellum). SYN. *Glossaspis*. ORD. *Orchideæ*. A monotypic genus, the species being a curious tuberous-rooted stove orchid, peculiar to the island of Hong Kong and the adjacent mainland. For culture, *see* **Glossodia.**

G. tentaculata (feeler-flowered). *fl.* green, small, in a slender, erect spike; lip deeply three-lobed; lobes long and thread-like, somewhat resembling the antennæ of an insect, hence the specific name. December. *l.* few, at base of the stem. *h.* 9in. (B. R. 862.)

GLOTTIDIUM. Now included under **Sesbania** (which *see*).

FIG. 116. DROOPING-FLOWERED GLOXINIA.

GLOXINIA (named in honour of Benj. Petr. Gloxin, of Colmar, a botanical writer). SYNS. *Escheria* and *Salisia* (of Regel). ORD. *Gesneraceæ*. A genus containing six species of elegant stove plants, all natives of tropical America. Flowers variously coloured, sometimes

Gloxinia—*continued.*

FIG. 117. ERECT-FLOWERED GLOXINIA.

variegated with spots, axillary, usually singly or a few together, large, nodding. Leaves opposite, stalked. The innumerable forms which are cultivated as Gloxinias

Gloxinia—*continued.*

rightly belong to the genus *Sinningia*, and most of them are derived from *S. speciosa*. On account, however, of their being so universally known as Gloxinias, the cultivation is here given.

Few stove plants are more beautiful than Gloxinias; and they may, by potting successionally, be had in flower throughout the greater part of the year. They always prove attractive in a warm house, and are very useful for cutting. The flowers originally were all drooping, as shown in Fig. 116, which detracted considerably from their beauty, as now exhibited in the numerous varieties with erect flowers (see Figs. 117 and 118). Some have colours of intense rich crimson; others are pure white, or are delicately spotted and pencilled internally.

Propagation. Gloxinias may be annually increased in large quantities by seeds, and by cuttings of the stems or leaves. Seeds should be sown early in February, in well-drained pots or small pans of finely-sifted soil, composed of peat, leaf mould, and sand, in about equal proportions. After the seeds are thinly sown, and only very slightly covered with soil, they should be carefully watered, placed in a temperature of about 70deg., and kept shaded. On the appearance of the seedlings, a sharp look-out must be kept, to prevent them damping; and, as soon as large enough, they should be pricked off, about 1in. apart, in other pots of similar soil, and, in due course, potted into single ones. Seedlings form good plants, and flower the same season, if sown early, and afterwards grown on without check, being always kept shaded, and in a moist, warm temperature. Cuttings of shoots may be secured when the old bulbs are started in spring; they strike very readily in a close propagating frame, and make good plants for flowering the following summer. Leaf cuttings may be inserted when the plants are ripening, or at other times if firm ones can be spared. They should be inserted with a small portion of the petiole attached—a bulb forms at the base of this for flowering the next year. A method of propagating more rapidly by matured leaves, is to cut through the midribs at the back of each, at distances of about 1in. apart.

FIG. 118. ERECT-FLOWERED GLOXINIA.

FIG. 119. GLOXINIA DIVERSIFLORA.

Gloxinia—*continued.*

and peg them down flat on pans of light soil, or on cocoa fibre, in a propagating frame. Numerous bulbils will eventually be formed at all the firmer parts of the midribs where incisions have been made, and may be collected from the soil or fibre when the other portions of the leaf are decayed.

Cultivation. Gloxinias are naturally summer-flowering plants, and should be started into growth about February, or earlier, if desired. A portion may be retained for a succession, to be followed, in early autumn, by seedlings, thus securing a long period for a display with even a limited number of plants. The roots should be removed from the dry soil in which they have been stored, or from other sources, as the case may be, placed in small pots, and stood in a temperature of about 65deg. The soil best suited is leaf mould, not too much decayed, and lumpy peat, in equal proportions, with the addition of a little sand or charcoal. Loam is sometimes used, but it is not required if watering is attended to. The pots should be well drained, and nearly filled, the bulbs being pressed in and covered with soil, which is best raised above them in the middle of the pot. No water is required until growth begins, except a little syringing round the pots, to prevent the soil becoming too dry. When growing, the plants require plenty of water, and are much benefited by copious syringings with tepid water morning and evening, in summer. Cold water must on no account be applied, or much injury will ensue. Before the small

FIG. 120. GLOXINIA GESNEROIDES.

Gloxinia—*continued.*

pots are filled with roots, and if the plants are calculated to grow strongly, a shift into the flowering sizes, which range from 5in. to 8in. in diameter, may be effected. A light position, and shading from sunshine, will ensure a sturdy growth, which eventually produces flowers of good substance. Air should be carefully admitted, and the leaves handled with caution, as they are exceedingly brittle. Artificial manure, or manure water, is beneficial when the flowers appear, but it should be kept from the foliage. The flowers last longer if the plants are subjected to a cooler temperature and more air at the flowering season. As the leaves ripen, water should be withheld; and when they die away, the roots may be stored in a dry place till the following spring, but they must not be exposed to cold.

Insects. The leaves and flower-stalks are frequently much injured by Thrips. If these are allowed a footing, it is difficult to effect eradication; but injury may be largely prevented by maintaining a moist atmosphere during the time the plants are growing.

G. diversiflora (variable-flowered). A pretty, dwarf, free-flowering hybrid, probably of garden origin. See Fig. 119.

G. gesneroides (Gesnera-like) is said to be a hybrid between a Sinningia and *Gesnera Donkelaariana.* It has fiery-red flowers. See Fig. 120, for which we are indebted to Messrs. Carter. The absurdity of the name is apparent; it is mentioned here solely because it is known by no other name in gardens.

G. glabra (glabrous). *fl.* white; throat yellow, spotted with purple; corolla funnel-shaped; lobes nearly equal, with wavy, finely-fringed edges; calycine segments foliaceous; peduncles axillary, solitary, one-flowered. August. *l.* ovate, acute, serrated, glabrous. Stem erect, simple, sub-tetragonal. *h.* 9in. 1847. (B. M. 4430, under name of *G. fimbriata.*)

G. maculata (spotted). *fl.* purplish-blue, downy; peduncles axillary, one-flowered, solitary. June to October. *l.*, radical ones cordate, obtuse, doubly toothed, shining above, reddish beneath. Stems simple, spotted. *h.* 1ft. South America, 1739. (B. M. 1191.)

G. multiflora. *See* **Nægelia amabilis.**

G. pallidiflora (pale-flowered). *fl.* pale blue; lobes of corolla concave; calycine segments linear, reflexed. August. *l.* broad, sub-obliquely ovate, obscurely serrated, rather pilose above. Stem erect, simple, spotless. *h.* 1ft. Santa Martha, 1844. (B. M. 4213.)

G. Passinghamii (Passingham's). A synonym of *Sinningia speciosa.*

G. speciosa (showy). A synonym of *Sinningia speciosa.*

Varieties. As a much greater variety in colour may be secured from mixed seeds than from a limited number of named sorts, the general and most satisfactory method of growing seedlings is here recommended. Seeds of erect and drooping varieties are sold in separate mixtures.

GLUMES. The floral envelopes of grasses.

GLUTINOSE. Adhesive, gluey.

GLYCINE (from *glykys*, sweet; the leaves and roots of one or two of the species are sweet). ORD. *Leguminosæ.* A genus of about twelve species of stove or greenhouse, twining or prostrate, slender or rarely sub-erect herbs, distributed over Asia, Africa, and Australia. *G. hedysaroides* (probably the only species introduced) thrives in a compost of peaty loam and a little sand. Propagated, in spring, by cuttings of young side shoots, inserted in sand, under a bell glass; or by seeds, sown in a hotbed.

G. Apios (Apios). A synonym of *Apios tuberosa.*

G. biloba (two-lobed). A synonym of *Cologania biloba.*

G. hedysaroides (Hedysarum-like). *fl.* purple, axillary, usually five together. June. *l.*, leaflets ovate, obtuse, mucronate, pilose beneath. Branches twining a little. Stem erect, tomentose. Guinea, 1823. Stove.

GLYCOSMIS (from *glykys*, sweet, and *osme*, smell; in allusion to the scent of the leaves and flowers). ORD. *Rutaceæ.* A genus comprising five species of unarmed stove trees and shrubs, inhabiting tropical Asia and Australia, and (one, doubtful) Africa. Flowers small, in axillary, rarely terminal, panicles. Berries small. Leaves unifoliolate or impari-pinnate; leaflets alternate, entire or serrate. The species thrive in a rich mould. Increased by cuttings, inserted in sand, under a hand glass, in heat.

Glycosmis—*continued.*

G. arborea (tree-like). *fl.* white. May to August. *l.* pinnate, in two pairs; leaflets long, obsoletely serrate. *h.* 20ft. East Indies, 1796. Tree.

G. citrifolia (Citrus-leaved). *fl.* white; peduncles axillary, shorter than the stalk. January to December. *l.* simple, and three-leafleted; leaflets ovate-oblong, acuminate. *h.* 6ft. China. Shrub.

G. pentaphylla (five-leaved).* *fl.* white. June and July. *l.* pinnate, in two pairs; leaflets elliptical, entire. *h.* 20ft. East Indies, 1790. Tree.

GLYCYRRHIZA (the old Greek name used by Dioscorides, from *glykys*, sweet, and *rhiza*, a root; in reference to the sweetness of the root). Liquorice. Including *Liquiritia*. ORD. *Leguminosæ*. A genus comprising about twelve species of hardy herbaceous perennials. Flowers blue, violet, white, or yellow, in axillary racemes. Leaves pinnate. Root long, perpendicular, sweet. These rather coarse-growing plants succeed in a deep sandy loam. Propagated by divisions, each of which should have one or more buds. The species most cultivated is *G. glabra*, from which is obtained the true liquorice.

G. echinata (prickly). *fl.* purple, in racemes not half so long as the leaves. June and July. *l.*, leaflets oval-lanceolate, mucronate, glabrous; stipules oblong-lanceolate. *h.* 3ft. Europe, 1596. Whole plant glutinous to the touch. (B. M. 2154.)

G. glabra (glabrous).* *fl.* pale blue, distant; spikes or racemes pedunculate, shorter than the leaves. Summer and autumn. *l.*, leaflets ovate, rather retuse, and somewhat clammy beneath, as well as the branches. Stem only terete at the apex. *h.* 3ft. to 4ft. Europe, &c., 1562.

G. lepidota (scaly). *fl.* whitish; spikes pedunculate, shorter than the leaves, dense. July and August. Pods beset with hooked prickles. *l.*, leaflets 15in. to 19in. long, oblong-lanceolate, acute, squamulose, under surface covered with glandular dots. Root creeping. *h.* 2ft. to 3ft. North America, 1817. (B. M. 2150.)

GLYPHÆA (from *glyphe*, carving, carved work; in allusion to the markings of the fruit). ORD. *Tiliaceæ*. A genus containing two species of stove shrubs, natives of tropical Africa. Flowers yellow; cymes few-flowered, axillary, lateral or terminal. Leaves denticulate, three-ribbed. For culture, *see* **Apeiba.**

G. grewioides (Grewia-like). *fl.* bright yellow, 1¼in. in diameter; cymes three to four-flowered, pubescent, with stellate hairs. September. *l.* glabrous, 4in. to 6in. long, membranous, oblong or ovate, rounded or slightly unequally cordate at the base, acuminate, acutely and irregularly toothed. Benguela, 1866. (B. M. 5610, under name of *Glyphæa Monteiroi.*)

GLYPHOSPERMA (from *glyphe*, carving, and *sperma*, seed; in allusion to the markings of the seed). ORD. *Liliaceæ*. A singular hardy plant, nearly allied to the European Anthericum. It has fascicled, fleshy, fibrous roots, and slender, soft, bright green, grass-like leaves. It thrives in any dry, sandy soil, but should be protected, during winter, from excessive moisture.

G. Palmeri (Palmer's). *fl.* white, starry, ¾in. in diameter, in panicled racemes. *l.* linear, channelled, 1ft. to 1½ft. long. Northern Mexico, 1884. (B. M. 6717.)

GLYPTOSTROBUS. *See* **Taxodium.**

GMELINA (named in honour of S. Gottlieb Gmelin, a celebrated German naturalist and traveller, 1743-1774). ORD. *Verbenaceæ*. A genus containing eight species of stove evergreen trees, natives of East India, Eastern Asia as far as China, the Malayan Archipelago, and tropical Australia. Flowers blue, pale violet, or yellow. Leaves opposite, entire. Gmelinas thrive in a rich fibry loam. Propagated by cuttings, made of firm young shoots, and inserted in sand, in heat. They are seldom seen in cultivation in this country; and, in all probability, the species described below is the only one yet introduced.

G. Rheedii (Rheed's). *fl.* white; thyrse many-flowered; corolla downy, bilabiate. June to August. *l.* rhomb-cordate, sometimes three-lobed, tomentose beneath. *h.* 20ft. East Indies, 1824. Plant arboreous, downy. (B. M. 4395.)

GNAPHALIUM (from *gnaphalon*, soft down; woolly covering of the leaves). Cudweed; Everlasting. ORD. *Compositæ*. A genus comprising about a hundred species of hardy, stove, or greenhouse, annuals, biennials, or perennials, spread over nearly the whole globe, from the tropics to the Arctic Circle. Flower-heads yellow or white, small, sessile, often clustered, rarely forming terminal corymbs; involucral bracts imbricated, scarious (whence the English name), and often coloured at the tips. Leaves alternate, entire, sessile, decurrent, or rarely petiolate. Few of the species (four of which are natives of Britain) are worthy of special mention in this work.

FIG. 121. GNAPHALIUM DECURRENS, showing Habit and Cluster of Flower-heads.

G. decurrens (decurrent). *fl.-heads* white, in cymosely disposed glomerules. July and August. *l.* strongly scented, lanceolate or linear, white beneath. *h.* 2ft. to 3ft. North America. Hardy perennial. See Fig. 121.

G. Leontopodium. *See* **Leontopodium alpinum.**

G. margaritaceum (pearly). Pearl Cudweed. A synonym of *Antennaria margaritacea.*

GNETACEÆ. A small order of shrubs, rarely trees, natives, for the most part, of tropical regions. Flowers monœcious or diœcious, with sheaths or laciniate scales, the female with a membranous, tubular, bifid, calyciform sheath. Leaves opposite, reticulated, sometimes scaly. The seeds of some of the species are edible. There are three genera—the best-known of which are *Ephedra* and *Welwitschia*—and about thirty species.

GNIDIA (pertaining to Gnidus, a town in Crete; a name given by the ancients to the Laurel). ORD. *Thymelaceæ*. A rather large genus (about fifty species are known) of greenhouse evergreen shrubs or under-shrubs; found in the Southern and Eastern tropical parts of Africa. Flowers white or pale yellow, inconspicuous; calyx funnel-shaped, with a regular four-cleft limb. Leaves scattered or opposite. Branches slender. The plants require a moist atmosphere, and a situation close to the glass. In other respects, they should be treated like **Pimelea** (which *see*).

G. denudata (shaven). *fl.* pale yellow. May to July. *l.* ovate-oblong, imbricated, hairy, with naked nerves. *h.* 1½ft. Cape of Good Hope, 1820. (B. R. 757.)

G. oppositifolia (opposite-leaved). *fl.* pale yellow, terminal; scales four. May to July. *l.* opposite, ovate, tomentose. *h.* 1ft. Cape of Good Hope, 1783. (B. M. 1902.)

G. pinifolia (Pine-leaved).* *fl.* creamy-white, very fragrant, disposed in umbellate heads. March and April. *l.* scattered, three-cornered. *h.* 1ft. Cape of Good Hope, 1768. (B. M. 2016.)

G. tomentosa (downy). *fl.* pale yellow, sessile, collected into a sort of fasciculated head at the extremity of the younger shoots, and surrounded by four closely-placed leaves, which form an involucre; tube long and slender, swollen at the base, clothed externally with long, white, rather silky hairs; segments faintly three-nerved. March and April. *l.* opposite, decussate, more or less spreading, sometimes reflexed, ovate or ovate-lanceolate,

Gnidia—*continued.*

very often approaching to oblong or elliptical, sessile, rather obtuse at the point, five-nerved, hairy. *h.* 3ft. to 4ft. Cape of Good Hope. (B. R. 2761.)

GOAT MOTH (*Cossus ligniperda*). The Goat Moth produces not only one of the largest of known European caterpillars, but also one of the most destructive to timber and fruit trees. The perfect insect measures from 2¾in. to 3in. from point to point of its fore wings, which are of an ashy-brown colour, shaded with dark brown, especially across the middle, and marked with many irregular transverse streaks, in the form of network. The hind wings are brown, the reticulation being marked with somewhat obscure lines; hence, the insect is difficult to detect while at rest, with folded wings, upon the stems of trees during the day. The female has a powerful ovipositor for the purpose of securing her eggs in crevices of the bark. As soon as the larvæ are hatched, they commence to eat away the bark next them, and, as growth proceeds, make their way towards the heart of the tree. The caterpillar (see Fig. 122) when fully grown, measures 4in. long, and is as thick as a man's finger. It exudes a liquid of a powerful and fœtid odour, somewhat resembling the unpleasant effluvium exhaled by the he-goat, whence the English name. The body is smooth, and bears short, scattered hairs; it is dark red on the back, with spiracles, or breathing apertures, of the same colour along the sides; the sides and under surface of the body are flesh-coloured, and the head is black. The jaws are very powerful, and capable of cutting the hardest wood. When two years old, the caterpillar changes to light yellow, surrounds itself with a strong cocoon, made of chips of wood, and assumes the pupa state—generally in spring, the perfect insect appearing in June or July.

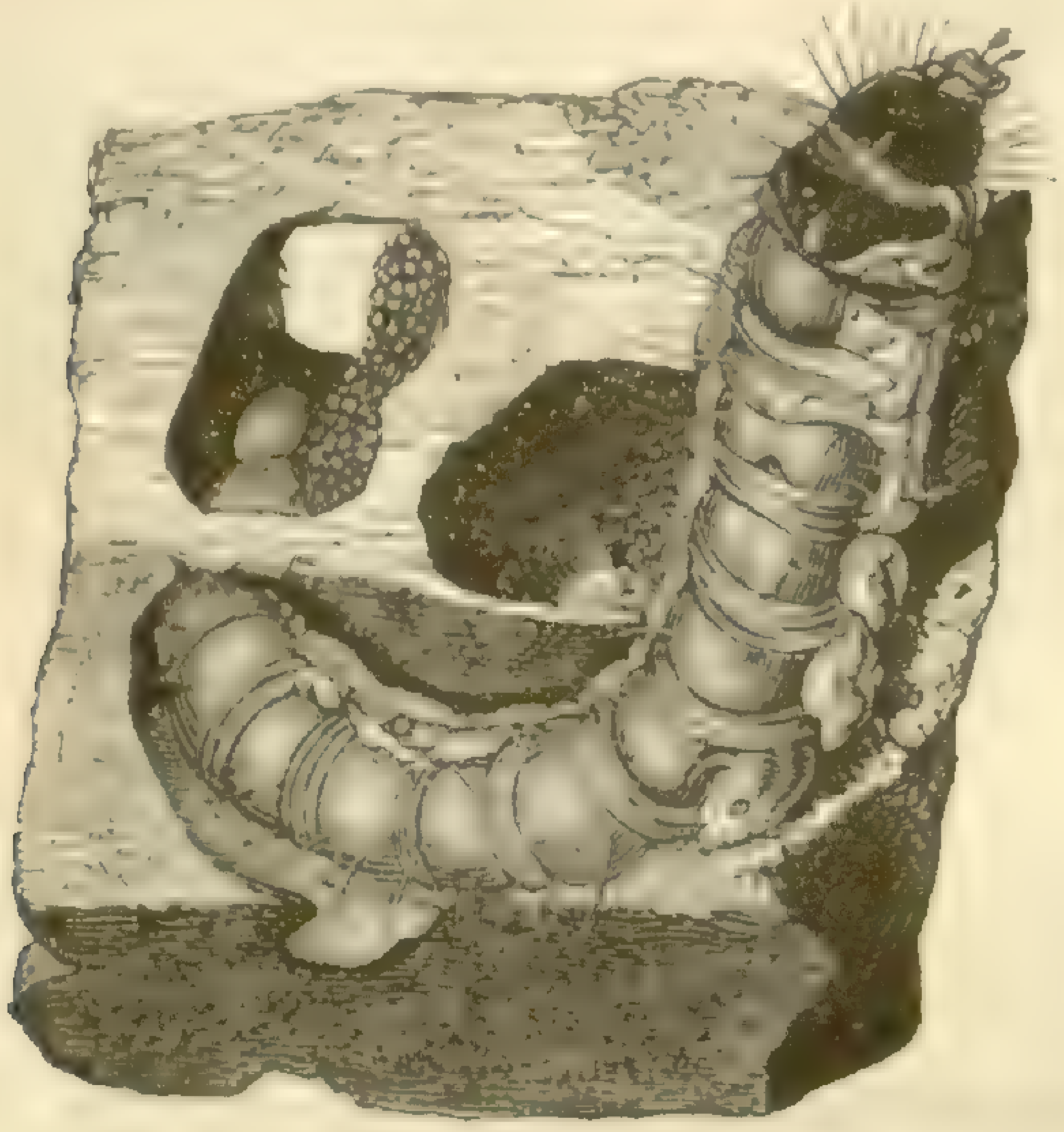


FIG. 122. LARVA OF GOAT MOTH.

Remedies. The remedies suggested are: Coating the trees with a mixture of cow-dung and clay, to prevent egg-laying; injecting paraffin or sulphur fumes into the holes; and felling the trees, splitting up, and destroying the caterpillars when badly infested.

GOAT'S BEARD. *See* **Spiræa Aruncus** and **Tragopogon.**

GOAT'S FOOT. *See* **Oxalis caprina.**

GOAT'S RUE. *See* **Galega.**

GODETIA. Included under **Œnothera** (which *see*).

GODOYA (named in honour of E. Godoy, a Spanish statesman, 1764-1839—commonly called Prince of the Peace, on account of his having concluded a peace between France and Spain—a patron of botany). ORD. *Ochnaceæ.* A genus comprising two species of stove trees, natives of Peru and New Grenada. Flowers yellow or white, disposed in terminal and axillary racemes or panicles; calyx twin-formed. Leaves alternate, coriaceous, thick, simple, marked with numerous transverse veins. Godoyas delight in a compost of peat and loam. Propagated by cuttings, inserted in sand, under a glass, in a strong bottom heat.

G. geminiflora (bud-flowered). *fl.* yellow; racemes axillary or terminal, compound, elongated. June. *l.* oblong, bluntish, obsoletely serrulated. *h.* 20ft. Brazil, 1820. An elegant species.

G. splendida (splendid).* *fl.* pure white, fragrant, ten to fifteen on a spike. *l.* pinnate, large. *h.* 10ft. Columbia, 1869. A compact-growing plant.

GODWINIA GIGAS. *See* **Dracontium gigas.**

GOETHEA (named in honour of J. W. Goethe, the celebrated German poet, 1749-1832, who was also an excellent botanist). ORD. *Malvaceæ.* A genus comprising about four species of stove evergreen shrubs, natives of Brazil. Flowers showy, nodding; peduncles axillary, one-flowered. Leaves entirely or remotely dentate. For culture, *see* **Pavonia.**

G. Makoyana (Makoy's).* *fl.* with a five-leaved epicalyx of large, cordate, ovate-acute, crimson bracts; borne in terminal clusters. *l.* shortly-stalked, elliptic, dull green, with two leafy lanceolate stipules. *h.* 2ft. 1878. (B. M. 6427.)

G. multiflora (many-flowered).* *fl.* with an epicalyx of numerous linear pink or red bracts. September. *l.* lanceolate, serrate. SYN. *Pavonia Wioti.* (B. M. 6398.)

G. semperflorens (ever-flowering). *fl.* purplish, with a white disk, usually terminal; involucre brown. *l.* elliptical, serrated at the apex. *h.* 30ft.

G. strictiflora (upright-flowered). *fl.* aggregated, axillary; bracts yellowish-white, tinged with red. August. *l.* ovate, large. *h.* 1½ft. 1852. (B. M. 4677.)

GOLD CUP. *See* **Ranunculus bulbosus.**

GOLDEN CHAIN. *See* **Laburnum vulgare.**

GOLDEN FEATHER. *See* **Pyrethrum.**

GOLDEN HAIR. A common name of **Chrysocoma Coma-aurea** (which *see*).

GOLDEN ROD. *See* **Solidago Virgaurea.**

GOLDEN SAXIFRAGE. *See* **Chrysosplenium.**

GOLDEN THISTLE. *See* **Scolymus hispanicus.**

GOLD FERN. *See* **Gymnogramme.**

GOLDFUSSIA. This genus is included, by the authors of the "Genera Plantarum," under **Strobilanthus** (which *see*).

GOLD KNOTS. *See* **Ranunculus acris.**

GOLD THREAD. A name given to the slender yellow roots of *Coptis trifolia*, an inhabitant of Canada and Siberia, where they are largely employed for dyeing skins and wool.

GOLDYLOCKS, or **GOLDILOCKS.** A common name for *Chrysocoma.* *See also* **Helichrysum Stœchas.**

GOMPHIA (from *gomphos*, a club; in reference to the shape of the fruit). Button Flower. ORD. *Ochnaceæ.* A genus comprising about eighty species of stove evergreen trees or shrubs, of which the majority are natives of South America, a few from Africa, and a very few from Asia. Flowers yellow, in terminal racemes or panicles; sepals five, coloured, imbricated; petals five, generally clawed. Leaves alternate, persistent, simple, coriaceous, shining, serrate. Gomphias thrive with similar treatment to that usually given to hard-wooded stove shrubs. A compost of two parts fibrous loam and the remainder of peat, with a small quantity of silver sand, suits them best. Propagated by cuttings of rather firm young shoots, inserted in sand, under a bell glass, in heat. The undermentioned are probably the only species now in cultivation.

G. decorans (adorned). A synonym of *G. olivæformis.*

G. olivæformis (Olive-formed).* *fl.* rich bright yellow, densely produced in large terminal branching racemes. May. *l.* shining dark green, alternate, broadly-lanceolate, 5in. long; margins serrulate. *h.* 10ft. to 15ft. Brazil, 1868. SYN. *G. decorans.* (B. M. 5262.)

Gomphia—*continued.*

G. Theophrasta (Theophrasta-like). *fl.* golden-yellow, densely produced in much-branched panicles, nearly 1ft. long. May. *l.* elongate, ovate-lanceolate, serrulate, 1ft. long, shortly stalked. South America. (B. M. 5642.)

GOMPHOCARPUS (from *gomphos*, a club, and *karpos*, a fruit; the follicles are ventricose). ORD. *Asclepiadeæ.* A genus comprising about eighty species of greenhouse herbs or sub-shrubs, natives of Southern and tropical Africa, Arabia, Central and North America. Flowers usually showy, on many-flowered, interpetiolar peduncles. Leaves opposite. The plants thrive in a compost of sandy loam and fibry peat. Propagated by seeds, sown in a hotbed, in spring; or by cuttings, made of small side shoots, when the plant is commencing new growth, and inserted in sand, under a bell glass.

G. arborescens (tree-like). *fl.*, corolla white, glabrous; peduncles, pedicels, and calyces villous. December. *l.* ovate-oblong, glabrous, with an acumen. Stem villous, branched. *h.* 4ft. to 6ft. Cape of Good Hope, 1714. Shrubby.

G. crispus (curled). *fl.* greenish-yellow; peduncles and calyces pilose. July. *l.* lanceolate-cordate, undulated, hispid. Branches downy. *h.* 1ft. to 2ft. Cape of Good Hope, 1714. Herb.

G. fruticosus (shrubby).* *fl.* white; peduncles and pedicels downy. June to September. *l.* linear-lanceolate, 4in. to 5in. long and 1in. broad. Stem downy. *h.* 5ft. to 7ft. Cape of Good Hope, 1714. The leaves of this shrub are sometimes employed to adulterate senna. (B. M. 1628.)

G. padifolius (Cherry-leaved). *fl.* axillary (not terminal), in shortly-stalked umbels of six to ten; corolla lobes purplish-green; divisions of the crown purplish-yellow. *l.* broadly cordate-ovate, sessile, decussate, in close opposite pairs, 2in. to 3in. long, acute, entire, glabrous; upper surface pale green, tinged with purple as they grow old; under surface glaucous, deeper in colour. Stem purplish-green, erect. *h.* 3ft. South Africa, 1867. Warm greenhouse herb. (Ref. B. 254.)

GOMPHOLOBIUM (from *gomphos*, a club, and *lobos*, a pod; in reference to the shape of the pod being like that of a club or wedge). ORD. *Leguminosæ.* A genus containing twenty-four species of elegant greenhouse shrubs, all from Australia. Flowers yellow or red, terminal or rarely in the upper axils, solitary or two or three together, or in short racemes. Leaves simple, or more frequently compound; leaflets usually narrow, digitate or pinnate, with the terminal leaflet sessile between the last pair; stipules small, lanceolate or subulate, or none. Gompholobiums should be grown in a compost of peat and loam, chopped into small pieces, but not sifted, with the addition of plenty of silver sand and small pieces of charcoal. Careful drainage and watering are of great importance in their culture. Propagated by cuttings, made of young shoots, about 2in. in length, during spring, inserted in sandy peat, under a bell glass, in shade.

G. aciculare (needle-shaped). A synonym of *G. tomentosum.*

G. barbigerum (bearded). A synonym of *G. latifolium.*

G. capitatum (headed). *fl.* yellow, very shortly pedicellate, in dense, terminal, leafy corymbs, almost contracted into heads; calyx usually very hirsute. July. *l.* the same as in *G. tomentosum*, or the leaflets rather more slender. *h.* 2ft. 1830. This species is closely allied to *G. tomentosum*, of which, perhaps, it is but a variety. (B. R. 1563.)

G. grandiflorum (large-flowered).* *fl.* large, solitary, or two or three together, shortly pedicellate, terminal, or on very short, axillary, leafy branches; standard broad, ¾in. long. June. *l.*, leaflets three, on a very short common petiole, narrow-linear, with a short, almost pungent point; margins revolute; veins inconspicuous. *h.* 2ft. 1803. (S. E. B. 5.)

G. grandiflorum (large-flowered). A synonym of *G. polymorphum.*

G. heterophyllum (variable-leaved). A synonym of *G. Knightianum.*

G. Knightianum (Knight's).* *fl.* pink or purple, in a short corymbose raceme, on a rather long peduncle above the last leaves; standard broad, rather longer than the calyx; wings and keel rather shorter. August. *l.* mostly pinnate, with five to eleven lanceolate or linear leaflets, obtuse or mucronate, flat, or with slightly recurved margins; stipules subulate. Stems slender, rigid, ascending or erect. *h.* 1ft. or more. 1830. SYN. *G. heterophyllum.* (B. R. 1468.)

G. lanatum (woolly). A synonym of *G. tomentosum.*

G. latifolium (broad-leaved). *fl.* golden-yellow, about 1in. long; vexillum large. April to June. *l.* ternate; leaflets linear, acutish. Stem erect; branches angular. *h.* 1ft. to 2ft. 1824. SYN. *G. barbigerum.* (B. M. 4171.)

Gompholobium—*continued.*

G. marginatum (edged). *fl.* yellow, small, few, in irregular, loose, terminal racemes, or rarely solitary; standard about four lines long, deeply notched; lower petals scarcely exceeding the calyx. May. *l.*, leaflets three, or rarely solitary, on a common petiole, from obovate to linear-oblong, with a short sharp point, coriaceous, bordered by a thickened nerve-like edge; stipules lanceolate-subulate or setaceous. Stems slender, rigid, decumbent or ascending, under 1ft. long. 1820. (B. R. 1490.)

G. minus (smaller). *fl.* yellow. May. *l.* glabrous; leaflets three, on a very short common petiole. A much-branched shrub. SYN. *Burtonia minor.*

G. pedunculare (long flower-stalked). A synonym of *G. polymorphum.*

G. polymorphum (many-formed).* *fl.*, vexillum scarlet on the inside, with a yellow base, and purple on the outside, large; pedicels much longer than the leaves. March to August. *l.*, leaflets three to five, linear, or oblong-cuneated, mucronate, with recurved margins. Stems procumbent, weak, twining. (B. M. 1533.) SYNS. *G. grandiflorum, G. pedunculare, G. tenue* (B. R. 1615), and *G. venulosum* (B. R. 1574). *G. versicolor* is a luxuriant form, having large flowers and long leaflets (B. M. 4179; B. R. 1839, 43; P. M. B. xii. 219.)

G. tenue (slender). A synonym of *G. polymorphum.*

G. tomentosum (shaggy). *fl.* yellow, terminal, few, in compact, leafy corymbs, or rarely solitary; standard about six lines long; keel rather shorter, broad, somewhat curved, the edges minutely ciliate. May. *l.*, leaflets usually five or seven, but varying from three to eleven, narrow-linear; margins revolute, so as to be almost terete, mucronate, more or less pubescent. *h.* 1ft. to 3ft. 1830. SYNS *G. aciculare, G. lanatum* (B. R. 1474).

G. venulosum (veiny-leaved). A synonym of *G. polymorphum.*

G. venustum (charming).* *fl.* purple; corymb stalked, many-flowered. April to July. *l.* impari-pinnate, with many pairs of leaflets; leaflets awl-shaped, veiny, with revolute margins, glabrous. *h.* 1ft. to 3ft. 1803. (B. M. 4258.)

GOMPHOSTYLIS CANDIDA. A synonym of **Cœlogyne maculata** (which *see*).

FIG. 123. FLOWERING BRANCH OF GOMPHRENA GLOBOSA.

GOMPHRENA (altered from *Gromphæna*, the name given by Pliny to a kind of Amaranth). Globe Amaranth. ORD. *Amarantaceæ.* A large genus (about

Gomphrena—*continued.*

seventy species) of half-hardy, annual, biennial or perennial herbs, abounding in tropical America and Australia, one species being widely dispersed through Asia and tropical Africa. Flower-heads generally sessile and solitary at the tips of the branches. Leaves opposite, sessile or shortly-stalked, entire. The common globe-flowered species is one of the prettiest hardy plants grown. It is admirably adapted for the summer decoration of greenhouses and conservatories, forming a neat, erect-branched growth of about 2ft., and a profusion of richly-coloured flower-heads. In order to retain the beauty of these for a considerable period, they should be cut previous to full maturity. For culture, *see* **Celosia.**

G. globosa (globe-flowered).* *fl.-heads* various. July. *l.* pubescent, oblong. *h.* 1½ft. India, 1714. Annual. See Fig. 123. (B. M. 2815.) Of the many varieties, *nana* is perhaps the prettiest, with flowers of a fine dark red; it rarely exceeds 5in. in height, and is usually 7in. to 8in. in diameter. Other varieties are: *alba*, *aurea superba*, *carnea*, *Isabellina*, *purpurea*, and *striata*.

G. perennis (perennial). *fl.-heads* pale yellow, two-leaved; florets distinguished by a peculiar perianth. July to October. *l.* lanceolate. *h.* 2ft. South America, 1732. (B. M. 2614.)

G. pulchella (neat). *fl.-heads* rosy, globose, smooth; involucre many-leaved; segments of staminous tube bicuspidate; peduncles elongated. July. *l.* lanceolate. *h.* 1½ft. Brazil, 1843. Annual (?). (B. M. 4064.)

GONATANTHUS (from *gonu*, *gonatos*, a knee, and *anthos*, a flower; referring to the bent spathe). Ord. *Aroideæ* (*Araceæ*). A distinct and interesting stove perennial, allied to *Colocasia*. For culture, *see* **Caladium.**

G. sarmentosus (twiggy). *fl.* very fragrant; spathe rich golden-yellow, 6in. long, crane-neck shaped; spadix about ½in. in length. May. *l.* pale green, marbled with a dark shade, very handsome. Himalaya. (B. M. 5275.)

GONATOPUS. Included, by the authors of the "Genera Plantarum," under **Zamioculcas** (which *see*).

GONGORA (named after D. Antonio Cabellero, of Gongora, once Viceroy of New Granada, and a zealous patron of Mutis). Including *Acropera*. Ord. *Orchideæ*. A singular genus, comprising more than a score species of ornamental, evergreen, stove epiphytal orchids, natives of tropical America. Flowers drooping, in racemes, sometimes 2ft. long; lateral sepals free and spreading; upper one remote and connate with the column; petals small, adnate to the middle of the column; lip clawed, continuous with the base of the column. Leaves broadly lanceolate, plaited, 1ft. or more long. Pseudo-bulbs oblong, two-leaved. Gongoras should be grown in baskets of peat and moss, and with the temperature of a cool end of the Cattleya house. A liberal supply of water, both to leaves and roots, may be applied during summer. During winter, little will be required, but the pseudo-bulbs must not be allowed to shrivel. This genus, although somewhat neglected of late, possesses several free-flowering and handsome species, of which the following are a selection:

G. armeniaca (Apricot-coloured). *fl.* rich yellow, slightly spotted with red; raceme rather lax, twelve to twenty-flowered, pendulous, 1ft. or more long. Summer. *l.* twin, broad, light green, produced on the top of the oval pseudo-bulbs. Nicaragua, 1850.

G. atropurpurea (dark-purple). *fl.* dark purple, borne in great profusion; racemes long. Summer. *l.* light green. Pseudo-bulbs ribbed. Trinidad, 1824. An old but very pretty species, of compact growth. (B. M. 3220.)

G. bufonia major (large frog-like). *fl.* elegantly variegated with purple and white. Brazil, 1837. This species much resembles *G. atropurpurea* in habit, leaves, and pseudo-bulbs.

G. Galeottiana (Galeotti's). *fl.* red, yellow. April. Mexico, 1842.

G. maculata (spotted).* *fl.* yellow, spotted with rosy-red; racemes more than 1ft. long, pendulous. May. *l.* dark green. Pseudo-bulbs ribbed. *h.* 1½ft. Demerara, 1832. (B. M. 3687.) There are, or were, numerous varieties of this species, one of the best being *grandiflora*, in which the flowers are pure white, with a few rosy spots on the lip, and the pseudo-bulbs more deeply ribbed than in the type. Guiana, 1836.

Gongora—*continued.*

G. portentosa (monstrous). *fl.* 1½in. to 2in. long; sepals pale flesh-coloured; petals and lip speckled with small violet-purple spots; raceme elongated, many-flowered. April. Ecuador, 1869. A pretty compact-growing species. (B. M. 6284.)

G. speciosa (showy). A synonym of *Coryanthes speciosa*.

GONIOPHLEBIUM. *See* **Polypodium.**

GONIOPTERIS. *See* **Polypodium.**

GONOCALYX (from *gonos*, an angle, and *calyx*; in allusion to the angled calyx). Ord. *Vacciniaceæ*. The only species of this genus is the one described below; it is a charming cool-house bushy evergreen, from New Grenada. For culture, *see* **Thibaudia.**

Fig. 124. Gonocalyx pulcher.

G. pulcher (beautiful). *fl.* deep bright red, white; corolla tubular. Spring. *l.* shortly stalked, nearly round, small, obtuse, tinted with rose-purple when young, bright green when old. See Fig. 124.

GONOLOBUS (from *gonia*, an angle, and *lobos*, a pod; in reference to one of the original species having costate-angled follicles). Ord. *Asclepiadeæ*. A genus containing about seventy species of stove, greenhouse or hardy, twining or prostrate, shrubs or sub-shrubs, natives of tropical and North America. Flowers dull or dark-coloured, in racemes or corymbs; peduncles interpetiolar; corolla rotate or reflexed, spreading; limb five-parted. Leaves opposite, very often cordate. The greenhouse and stove species thrive, with ordinary treatment, in a compost of loam and peat. Cuttings will root readily in sand, under a glass. The hardy sorts require a light sandy soil, and a warm dryish situation; and may be increased by divisions or by seeds.

IRIS AUREA

Gonolobus—*continued.*

G. carolinensis (Carolina).* *fl.* purplish, umbellate; segments of corolla oval-oblong, bluntish. June and July. *l.* ovate-cordate, acuminated, downy, on longish petioles. Stem and petioles hairy. Carolina, 1824. Greenhouse deciduous. (S. B. F. G. 1.)

G. Cundurango (Condor Vine). The correct name of this plant is **Marsdenia Cundurango** (which *see*).

G. diadematus (diademed). *fl.* green; crown at bottom of tube. September and October. *l.* oblong, elliptical, lanceolate, cordate. Mexico, 1812. Stove. (B. R. 252.)

G. lævis (smooth). *fl.* green; umbels many-flowered; corolla rather elongated-conical in the bud, not twisted; lobes narrowly or linear-lanceolate, obtuse, glabrous inside. June. *l.* oblong-cordate, with a deep and narrow but open sinus, conspicuously acuminate. North America, 1806. Hardy herbaceous. There is a variety, *macrophyllus*, with broadly-cordate leaves, and with the rounded basal lobes approximate or even overlapping.

G. niger (black). *fl.* black, or very dark purple; racemes few-flowered. October. *l.* ovate-cordate, acute. Mexico, 1825. Stove evergreen. (B. M. 2799.)

G. obliquus (oblique). *fl.* in umbels, sometimes cymosely compound or geminate; corolla in the bud oblong-conical; lobes crimson-purple inside, dull or greenish and minutely pubescent outside. Summer. *l.* from rounded to ovate-cordate, with a narrow sinus, abruptly acuminate. North America, 1809. Hardy. SYN. *Cynanchum discolor* (under which name it is figured in B. M. 1273.)

G. suberosus (sub-erose). *fl.*, umbels three to nine-flowered, much shorter than the petiole; corolla broadly conical, and with abrupt acumination, twisted in the bud; lobes ovate, or becoming triangular-lanceolate, acute, of thickish and firm texture. Summer. *l.* cordate, with an open and shallow, or sometimes deeper and narrow, sinus, acuminate, minutely pubescent, glabrate, or sometimes hairy. North America, 1732. Hardy. SYN. *Cynanchum suberosum.*

GONOSTEMON. Included under **Stapelia.**

GOODENIA (named in honour of Dr. Samuel Goodenough 1743-1827, Bishop of Carlisle, author of a monograph of the genus *Carex*, published in the "Linnæan Transactions"). ORD. *Goodenovieæ.* A genus containing about seventy species of greenhouse herbs or sub-shrubs, rarely shrubs, limited to Australia. Flowers yellow, purplish, or blue; peduncles either axillary or in terminal racemes or panicles. Leaves alternate or radical. Goodenias thrive in a compost of peat and loam. Propagated by cuttings, which root freely under a bell glass, during spring. The species described below are those usually seen in cultivation.

G. grandiflora (large-flowered). *fl.* yellow, more or less streaked with purple, large; corolla glabrous or slightly pubescent outside; peduncles axillary, one-flowered. July. *l.* petiolate, from broadly ovate to ovate-lanceolate, truncate or cordate at the base, toothed. *h.* 3ft. to 4ft. 1803. Herbaceous. (B. M. 890; B. R. 1845, 29.)

G. lævigata (smooth). A synonym of *Scævola microcarpa.*

G. ovata (ovate). *fl.*, corolla yellow, glabrous outside; peduncles axillary, often two together or forked near the base, slender and often several-flowered. July. *l.* petiolate, from ovate to broadly lanceolate, or the lower ones sometimes almost orbicular-cordate, denticulate, 1in. to 2in. long. *h.* 2ft. to 4ft. An erect, glabrous, often somewhat viscid shrub or under-shrub. (A. B. R. 68.)

G. stelligera (star-haired). *fl.* yellow, sessile or nearly so, in clusters of two or three, the upper ones solitary, in a long, interrupted spike; corolla densely villous outside. June. *l.*, radical ones linear, or slightly linear-acute, obtuse, rather thick, entire; stem ones very few, and much shorter; floral ones reduced to linear bracts. Stems erect, almost leafless. *h.* 1ft. to 1½ft. 1823. Perennial.

G. tenella (tender). A synonym of *Velleia trinervis.*

GOODENOVIEÆ. A natural order of herbs, sub-shrubs, or rarely shrubs, the juice not milky. Flowers hermaphrodite, axillary or in terminal spikes, racemes, or panicles, the primary inflorescence centripetal, the secondary usually cymose and dichotomous; corolla yellow, blue, or white, rarely red or purple. Leaves alternate or radical, very rarely irregularly opposite, entire, toothed, or rarely pinnatifid. The order is almost exclusively Australian, a few species only of one genus (*Scævola*) being known from New Zealand, the Pacific Islands, and the coasts of tropical and sub-tropical Africa, Asia, and America; and one of another genus (*Calogyne*), perhaps not different from an Australian one, extending to the coast of China. There are about twelve genera and two hundred species. Good examples are: *Dampiera, Goodenia, Leschenaultia, Scævola,* and *Velleia.*

GOODIA (named in honour of Peter Good, a botanical collector, who was employed in collecting seeds in Australia, where he died). ORD. *Leguminosæ.* A genus containing two species of ornamental greenhouse evergreen shrubs, natives of Australia. Flowers golden-yellow, like those of *Laburnum*, but smaller; calyx two-lipped, the lips not deeply divided; stamens all united in a sheath. Leaves pinnate, trifoliolate; leaflets entire. Goodias thrive in a compost of sandy peat and fibry loam. Propagated by seeds, which usually ripen in abundance; or by cuttings, made of the young shoots, during spring, and inserted in sand, under a bell glass.

G. lotifolia (Lotus-leaved).* *fl.* yellow, but with the base of the vexillum red. April to July. *l.*, leaflets obovate, smooth. *h.* 2ft. to 4ft. 1733. (B. M. 958; L. B. C. 696.)

G. pubescens (downy).* *fl.* yellow, spotted with red. Summer. *l.*, leaflets obovately-cuneated, pubescent. Branches and peduncles rather hispid. *h.* 1ft. to 3ft. 1803. (B. M. 1310.)

GOOD KING HENRY. *See* **Chenopodium Bonus-Henricus.**

GOODYERA (named in honour of John Goodyer, a British botanist, who assisted Johnson in his edition of "Gerard's Herbal"). SYNS. *Peramium, Tussacia.* ORD. *Orchideæ.* A genus of about twenty-five species of hardy, greenhouse, or stove terrestrial orchids, with flower-spikes issuing from the centre of the foliage, and thick, fleshy roots. Some species have their dark, velvet-like foliage marked like that of some Anœctochili. The greenhouse and stove sorts thrive best in small pots or shallow pans, in a compost of well-drained peat and sand, with a little loam; and require a liberal supply of water when in a growing state. Propagated by cuttings, taken with a piece of root to each, inserted in similar soil to that already mentioned, and placed under a bell glass. The hardy species should be grown in a shady position, and in moist, peaty soil, with which soft sandstone may be incorporated. The best species is undoubtedly *G. discolor.*

G. cordata (heart-shaped). *fl.* yellowish-brown; racemes usually several-flowered. September. *l.* few, oblong-acute, usually cordate at the base. Stem upright. India, 1840. Stove. SYN. *Georchis cordata.*

G. discolor (two-coloured).* *fl.* pure white, with a lemon-yellow blotch on the lip, which is curiously twisted or contorted; spikes numerous, erect, about 10in. high, remaining a considerable time in perfection. Winter. *l.* 2in. long, 1in. broad, rich dark velvety green, with interrupted longitudinal white stripes, more or less distinct. South America, 1815. Greenhouse. (B. M. [illegible].)

G. Dominii (Dominy's). *l.* larger than those of *G. discolor*, with a dark, bronzy, velvet-like appearance, and lightish longitudinal lines. A very handsome garden hybrid. Stove.

G. macrantha (large-flowered).* *fl.* pale rose, large, two or three at the ends of the shoots. June. *l.* ovate, acute, bordered with yellow; central parts dark green, reticulated with pale green lines. Japan, 1867. This pretty plant is nearly hardy. SYN. *G. picta.* (G. C. 1867, 1022.)

G. picta (painted). A synonym of *G. macrantha.*

G. pubescens (downy).* *fl.* white. July. *l.* green, delicately veined with silver. *h.* 3in. North America, 1802. A very pretty little species, suitable for growing either in a cool house or pit, a cool fernery, or out of doors; in the latter case, it thrives best when planted under evergreen shrubs, in deep shade, and in a compost of peat and leaf mould. There is a pretty form of this, *minor* (figured in B. M. 2540).

G. repens (creeping). *fl.* white, with a sweet scent; spike spiral, secund. July. *l.* ovate, dark, evergreen. *h.* 6in. Northern hemisphere (Britain). This species thrives well in a leaf mould, in deep shade. (Sy. En. B. 1475.)

G. rubicunda (reddish). *fl.* reddish. July. *l.* velvet-like, with three longitudinal bands of red down each leaf. Manilla, 1838. Stove. SYN. *G. rubrovenia.*

G. rubrovenia (red-veined). A synonym of *G. rubicunda.*

G. Veitchii (Veitch's).* *l.* rich deep reddish-brown, with a few silver ribs. A vigorous hybrid between *G. discolor* and *Anœctochilus Veitchii.* Stove.

G. velutina (velvety).* *fl.* white, shaded with rose or salmon; spike usually ten-flowered, terminal. *l.* ovate, acute, deep velvety, purplish-green, with a well-defined white costa. Japan, 1867. A very pretty, nearly hardy plant. (R. G. 533.)

GOORA NUT. *See* **Cola acuminata.**

GOOSEBERRY (*Ribes*). The Gooseberry is a hardy deciduous shrub, native of various parts of Europe, including Britain, where it is either indigenous or has been introduced at an early period, and become naturalised. Its cultivation is neglected in France, Italy, Spain, and Southern Europe, but is much practised in Britain, where the fruit has been highly esteemed since the time of Henry VIII., and is still one of the most popular grown. Plants, under favourable conditions, are recorded as having attained an age exceeding forty years. Two remarkable ones are stated to have been growing about the year 1821, against a wall in the garden of the late Sir Joseph Banks, at Overton Hall, each measuring upwards of 50ft. from one extremity of the branches to the other. Gooseberries succeed well in the North of England and Scotland, and the fruits attain a higher flavour in these parts, where the temperature is moderate and comparatively cool, than in the hotter climate of the South, where they frequently become prematurely ripened by scorching sun and an insufficiency of moisture. In Lancashire, Cheshire, and neighbouring counties, the raising of Gooseberries has received special attention; more, perhaps, by encouragement offered for very large fruits, than for their superior quality when ripe. These large-fruited varieties are, however, valuable in a green state for cooking, being sufficiently grown for the purpose before the smaller sorts, which are, as a rule, of the highest flavour when gradually and properly ripened. The crop is a valuable and usually remunerative one in the neighbourhood of large towns, where there is a demand for the fruit, both in a green and ripened state. It is one of the earliest in use for cooking, bottling, or preserving when green, and, when ripe, a selection of varieties and a cool aspect, will ensure a supply for dessert from an early season until late in the autumn. Although the bushes are quite hardy, the leaves and tender young fruits are very liable to destruction by late spring frosts, if these suddenly happen after a spell of mild weather.

Propagation may be readily effected by seeds, cuttings, layers, or suckers. The first method is only adopted with a view to raising new varieties, as none of those existing reproduce themselves true from seed; neither will the product be restricted to fruit of the same colour as that from which the seeds were collected. If any are required, they should be washed from the ripe fruit, merely dried on sheets of paper, and then sown in the open ground, afterwards covering with about 1in. of light soil. The young seedlings will be ready for transplanting the following autumn, and will usually require about three years' growth before fruiting. Propagation by cuttings is the mode generally practised, and it is one that is tolerably certain, if the cuttings are healthy and properly put in. Strong, well-ripened shoots should be selected, and taken off, if possible, at their junction with the older wood. The tops will require shortening to make the cutting about 1ft. long, and all eyes must be carefully removed from the lower half before placing in the soil. Early autumn is the best time for this operation. An open piece of moist ground should be selected, and the cuttings inserted thickly in trenches 4in. deep, the soil being then filled in and evenly trodden, and other lines cut out in a similar way, about 1ft. apart. Under this treatment, plenty of time is allowed the cuttings to callus before spring, and good plants, ready for training in any form desired, will be available the following year. Layering is a certain method for increasing any variety in summer, by pegging the branches down, and covering them with some light soil. Large branches, or merely their tops, may thus be successfully rooted and removed to permanent positions the same season. Such plants are not so symmetrical as others raised from cuttings; but the method is useful for the perpetuation of scarce varieties. Suckers have the disadvantage of continually increasing themselves in a similar way from the

Gooseberry—*continued.*

base. They are objectionable on this account, as it is difficult to keep all the eyes removed from the part which is under ground.

Cultivation, Site, &c. The Gooseberry thrives in any good garden soil that is of a moist, rather than dry, character, and not sufficiently heavy to cake hard in dry weather. For growing specially fine fruit, a rich loamy soil, with plenty of decayed manure, should be prepared, and plenty of water supplied throughout the summer. An open situation is best for giving the highest flavour to ripe fruit; but, if too much exposed to easterly or other cold winds in spring, there is a danger of much injury being caused to the crop thereby. In the hottest parts of the country, the bush form is the best for the open quarter, as the branches then help to shade each

FIG. 125. FRUITING BRANCH OF GOOSEBERRY.

other, and protect the fruits that hang underneath (see Fig. 125) from scorching sunshine, which tends to prematurely ripen them. For an autumn supply for dessert, late varieties should be planted in a north border, or trained on a wall with that aspect, and protected from birds. Such plants are, as a rule, more likely to escape injury from spring frosts, as early growth is not encouraged, on account of the absence of sun on the plants. In planting bush trees in the open quarter, a distance of about 6ft. apart should be allowed, and the plants in each line placed opposite the angles formed by those in the preceding one. The intervening space may at first be partly occupied by some other crop until the Gooseberries are established. The latter should have the soil removed a little with a fork each autumn, and a dressing of manure applied round the stems. In the more northern parts of the country, a southern aspect, with exposure to sunshine, is most suitable, such as a position afforded by planting and training the trees thinly as espaliers. A number of sorts are naturally of a pendent habit, and are, consequently, best adapted for growing in the bush form. In districts like Lancashire, where very large fruits are grown, a special system of culture is adopted to attain that end, by planting in prepared soil, watering the roots, and placing, for a supply of moisture, saucers full of water under the limited number of fruits retained after severe thinning-out has been practised. This is only a means adopted for special purposes, to obtain large specimens, and it is generally conducted at the expense of high flavour. Where there is a prodigious crop, it is advisable, so soon as safety from frost is insured, to thin out some for use in the younger stages.

Pruning and Training. Gooseberries required for bushes in an open quarter should have a clear stem above

Gooseberry—*continued.*

ground of about 6in., to admit of the soil being hoed and forked underneath. If, on replanting the first year after inserting the cuttings, three shoots can be obtained at this height, they should be shortened to three or four eyes each. The following summer, two new shoots should be secured from each, and the laterals kept stopped for forming spurs, the main branches being cut back to about 1ft. the next autumn, and these, in due course, allowed two more each; this being sufficient to form, if evenly regulated, what is considered a perfect tree. Some of the pendulous varieties require propping with forked sticks, to keep the branches and fruit off the ground; others, of an erect, vigorous habit, may require tying down. In the annual pruning of established trees, the spurs should be preserved, and strong, well-ripened shoots of the previous summer retained, so far as practicable, to replace old wood, which does not bear fine fruit. Although plenty of room must be allowed each branch for the admission of light and air, it is not well to have them too thin in southern localities, on account of the shade from sunshine afforded the fruit by the leaves. When planted to cover north walls, the fan system of training may be adopted, and part of the old wood annually replaced; or the plants may be inserted, when young, 3ft. apart, and three shoots conducted from each at equal distances perpendicularly, afterwards pruning, in summer, with a view to limiting the production of fruit from spurs. Gooseberries succeed well in such a position; and if dessert varieties of good constitution are planted, and the necessary protection from birds, &c., is afforded, a supply may be secured much later than from the open ground.

Insects, &c. The Gooseberry suffers severely from the ravages of several destructive insects, which feed on the leaves so far as to entirely defoliate the trees. The principal depredators are the caterpillars of the Magpie Moth (*Abraxas grossulariata*) and of *Phalæna Vanaria*, and the larvæ of the Gooseberry and Currant Sawfly (*Nematus Ribesii*). Hand-picking, persistently practised from the first appearance of the insects, is the most certain cure; but this is almost impossible in extensive collections. Bushes situated near much-frequented walks, or placed under protection from birds, have been observed to become more infested than others fully exposed. This infers that birds of some sort, although it is doubtful which, either eat the insects or carry them away to feed their young. Cuckoos are considered special friends for this purpose; and sparrows, sparrow-hawks, and tomtits, have also been observed to visit the bushes frequently when infested with caterpillars; but whether for eating them or not, is somewhat uncertain. Lightly syringing the bushes, in the evening, with water, and then dusting with lime or flowers of sulphur, also scattering some of each and some soot round the plants, are means usually adopted as remedies. As most of these insects undergo their transformation in a young state, on or beneath the ground, various methods for destroying them there have been recommended, such as occasionally dusting with newly-slaked lime or Hellebore powder; or covering the soil, in spring, to a depth of 3in., with fresh tan. Great destruction is frequently caused to Gooseberries in some localities by birds, particularly bullfinches, picking out the buds in spring, and also devouring the fruit when ripe. A limited number of trees may be covered with netting; but, in a large collection, it is difficult to stop these attacks, when once begun.

Sorts. Gooseberries are divided into classes that are distinguished from each other by the colour of the fruits and the absence or presence of hairs on the skins. Varieties in each colour are very numerous, many of the smaller fruits being of the highest flavour, while the larger ones are fit for cooking earlier in the season. Those having red skins are variable in flavour, a large

Gooseberry—*continued.*

quantity being more or less acid. On account of their late-keeping properties, the best red sorts are most valuable for dessert fruit in autumn, after the majority of the others are past. The highest flavour is attained in the amber and yellow varieties, which are very tender in the skin, and mostly early in ripening. Many of the green ones are large, and contain but little pulp in proportion. Others of the same colour are small, but remarkably thin-skinned and rich in flavour when ripe. Amongst white sorts, there are several of good quality, but they are not so generally cultivated as the others. Subjoined is a selection from the leading varieties in each class. Those marked F, are specially recommended for flavour; and others marked S, for size.

Class I. Fruit with Red Skin.

Conquering Hero (S). Fruit dark red, very long and large, a little hairy. Branches slender, large, and spreading.

Crown Bob. Fruit bright red, of good flavour, roundish-oblong, hairy. Branches pendulous.

Dan's Mistake (S). Fruit light red, very large, hairy. Branches strong, erect. Useful variety for exhibition.

Dr. Hogg (F). Fruit purplish-red, long, broad, downy. Branches short-jointed, erect, vigorous.

Henson's Seedling. Fruit deep red, medium, of good flavour, very hairy; late. Branches erect. An abundant bearer.

Ironmonger (F). Fruit dark red, small, hairy. Branches spreading. Often confounded with, but inferior to, Red Champagne. SYN. Hairy Black.

Keen's Seedling (F). Fruit bright red, medium, oblong, very hairy; early. Branches pendulous. Great bearer.

Lion's Provider. Fruit light red, long, a little hairy. Branches long, slender, erect.

London (S). Fruit dark red, very large, roundish-ovate, smooth. Branches pendulous. A rather tender and uncertain bearer, but the largest gooseberry known.

Miss Bold (F). Fruit light red, medium, very downy; early. Branches spreading.

Monarch. Fruit deep red, very large, oblong, hairy. Branches strong, erect. A good bearer.

Plough Boy. Fruit light red, shaded yellow, very long, smooth; late. Branches slender, spreading.

Raspberry (F). Fruit dark red, small, hairy; early. Branches spreading, pendulous.

Red Champagne (F). Fruit light red, small, roundish-oblong, hairy. Branches very erect. A good bearer. SYNS. Countess of Errol and Ironmonger of Scotland.

Red Turkey. Fruit dark red, small, obovate, smooth; late. Branches somewhat erect.

Red Warrington (F). Fruit red, roundish-oblong, hairy; late, hangs well in autumn. Branches pendulous. One of the best for general cultivation. SYNS. Aston Seedling, Volunteer.

Rifleman. Fruit red, very large, roundish, hairy. Branches erect. A good bearer.

Rough Red (F). Fruit dark red, small, very hairy; early. Branches upright, spreading.

Wilmot's Early Red. Fruit dark red, large, smooth. Branches pendulous.

Wonderful (S). Fruit purplish-red, very large, smooth. Branches short-jointed, stiff, very tender in spring.

Class II. Fruit with Yellow Skin.

Broom Girl (F). Fruit large, with long stalk; skin dark yellow, hairy; early and first rate. Branches strong, erect.

Catherina (S). Fruit yellow, very large, obovate, slightly hairy. Branches slender, spreading.

Criterion. Fruit greenish-yellow, medium, a little hairy. Branches spreading, pendulous.

Drill (S). Fruit greenish-yellow, large, long, smooth; late. Branches spreading.

Early Sulphur (F). Fruit bright yellow, medium, very hairy; early and abundant. Leaves pubescent above. Branches erect.

Fanny. Fruit pale yellow, large, round, hairy. Branches erect.

Garibaldi (S). Fruit pale yellow, large, long; skin hairy. Branches spreading, pendulous.

Gipsy Queen (F). Fruit pale yellow, large, smooth; early. Branches slender, pendulous.

High Sheriff. Fruit deep yellow, large, round, very hairy. Branches spreading, pendulous.

Gooseberry—*continued.*

Leader (F). Fruit greenish-yellow, medium, of rich flavour, smooth; early. Branches spreading.

Leveller (S). Fruit greenish-yellow, very large, long, smooth. Branches spreading. An excellent bearer.

Lord Rancliffe. Fruit pale yellow, medium, round, hairy. Branches straight, spreading.

Moreton Hero (F). Fruit pale yellow, large, oval, smooth; skin thin. Branches free, spreading.

Mount Pleasant (S). Fruit deep yellow, long, hairy; late. Branches vigorous, spreading.

Peru (S). Fruit pale yellow, large, tapering, slightly hairy. Branches spreading, pendulous.

Rumbullion. Fruit pale yellow, small, very downy; early; much cultivated for bottling. Branches erect.

Smiling Beauty (F). Fruit yellowish-white, large, oblong, quite smooth; early. Branches pendulous.

Sulphur. Fruit yellow, small, roundish, hairy, and of good flavour; rather late. Branches erect. SYN. Rough Yellow.

Yellow Ball (F). Fruit yellow, medium, thick-skinned, smooth. Branches erect.

Yellow Champagne (F). Fruit small, of rich flavour, hairy; late. Branches erect. One of the best yellows. SYN. Hairy Amber.

Class III. Fruit with Green Skin.

Glenton Green (F). Fruit medium, oblong, with very hairy, thick skin. Leaves pubescent above. Branches pendulous.

Green Gascoigne (F). Fruit deep green, small, round, hairy; early. Branches erect. Free bearer.

Green London (S). Fruit bright green, medium, smooth. Branches short-jointed, spreading.

Green Overall (F). Fruit dark green, of good flavour, medium size, smooth. Branches spreading. An excellent variety.

Green River. Fruit deep green, smooth, medium, oval. Branches spreading.

Green Walnut (F). Fruit dark green, smooth, medium, obovate, skin thin; early. Branches long, spreading. SYNS. Nonpareil, Smooth Green.

Gregory's Perfection. Fruit green, downy, large, round. Branches pendulous. Good late variety.

Heart of Oak (F). Fruit smooth, large, oblong; skin green, with yellowish veins; footstalk thick, tapering into the fruit. Branches pendulous.

Hebburn Prolific (F). Fruit medium, roundish, hairy. Branches erect. An early and abundant bearer.

Jolly Anglers. Fruit large, oblong, of good quality, downy; late. Branches erect.

Keepsake. Fruit green, large, smooth, sometimes a little hairy; ripens early. Branches vigorous, pendulous.

Laurel. Fruit pale green, downy, large, obovate; late. Branches erect. An abundant bearer. SYN. Green Laurel.

Lord Eldon (F). Fruit dark green, smooth, round, very rich flavour; early. Branches slender, spreading.

Pitmaston Greengage (F). Fruit small, obovate, smooth, of rich flavour; hangs well. Branches erect.

Random Green (F). Fruit deep green, smooth, large, of good flavour. Branches spreading. A good bearer.

Roseberry (F). Fruit large, round; skin dark-green, smooth. Branches vigorous, erect. A very productive and good variety.

Shiner (S). Fruit very large, round, smooth, one of the largest gooseberries grown. Branches spreading.

Stockwell. Fruit bright green, long, smooth. Branches slender, spreading.

Telegraph (S). Fruit large, long, smooth; late. Branches short-jointed, spreading.

Thumper (S). Fruit large, flat-sided, smooth, of good flavour; late. Branches pendulous.

Thunder (F). Fruit large, roundish, hairy, of excellent flavour; early. Branches short-jointed, erect.

Class IV. Fruit with White Skin.

Abraham Newland (F). Fruit white, large, oblong, slightly hairy, rich-flavoured; late. Branches erect.

Adams's Snowball. Fruit medium, roundish; skin hairy. Branches pendulous.

Antagonist (S). Fruit creamy-white, very large, long, hairy, of good flavour. Branches spreading. A heavy cropper, and the largest white gooseberry grown.

Bright Venus (F). Fruit medium, obovate, slightly hairy; hangs well. Branches erect.

Careless (S). Fruit creamy-white, large and long, smooth, very handsome. Branches slender, spreading. An abundant bearer.

Cheshire Lass. Fruit large, oblong, downy, of rich sweet flavour. Branches erect. Very early, and a good bearer.

Gooseberry—*continued.*

Crystal (F). Fruit small, roundish, smooth. Branches spreading, pendulous. A valuable late variety.

Early White (F). Fruit roundish-oblong, downy, of rich flavour; skin thin; very early. Branches spreading.

Hero of the Nile (S). Fruit greenish-white, large, smooth. Branches spreading.

King of Trumps (F). Fruit roundish-oblong, slightly hairy, of good flavour. Branches slender, spreading.

Lady Leicester (S). Fruit large; skin whitish, with green veins, hairy; early. Branches spreading.

Mayor of Oldham (F). Fruit greenish-white, round, smooth, of excellent flavour. Branches spreading.

Princess Royal. Fruit large, obovate, hairy, of good flavour Branches pendulous. A good bearer.

Queen of Trumps (S). Fruit long, flat-sided, smooth, large, and of excellent flavour. Branches vigorous, spreading.

Royal White. Fruit small, round, slightly hairy. Branches erect.

Snowdrop (F). Fruit very large, roundish, of excellent flavour; skin white, with broad green veins, hairy. Branches slender, spreading. One of the best grown.

White Champagne (F). Fruit small, roundish, sweet and rich, hairy. Leaves pubescent above. Branches erect.

White Fig. Fruit small, obovate, smooth; will hang till it shrivels. Branches erect.

White Lion. Fruit large, obovate, slightly hairy, rich flavour Branches pendulous. Very late variety

Woodward's Whitesmith (F). Fruit white, downy, large, roundish-oblong, of excellent flavour. Branches erect. Rather early, an abundant bearer, and one of the best in cultivation. SYNS. Hall's Seedling, Lancashire Lass, Sir Sidney Smith, &c.

GOOSEBERRY AND CURRANT SAWFLY (*Nematus Ribesii*). This is a well-known enemy to the gardener, from the damage the larvæ do to Gooseberry and Currant bushes, completely stripping them of their leaves. The eggs are laid in spring, on the under side of the newly-expanded leaves, and are hatched in a few days. The caterpillars are of a peculiar bluish-green colour, with black spots on the segments and yellow markings by the head and tail. They have as many as twenty legs. When full grown, they descend into the earth, and either at once assume the chrysalid state, and thence become perfect flies, or else hibernate till the following spring, before making their final changes. The following are a few of the remedies given for the extermination of the pest:

Tobacco Powder. This, dredged over the bushes, at night and early in the morning, will dislodge the worms, and they can be trodden on or picked up by hand and destroyed.

Soot and Lime. Equal parts of dry soot and air-slaked lime, mixed together, and dusted over the foliage whilst in a damp state, and when the caterpillars are small, will help to keep the plants clear. When the leaves are fallen, they should be raked together and removed or burnt. A good dressing of soot and lime must then be applied to the ground, which should not be dry at the time, and the same operation should be repeated in spring.

Hellebore. Freshly-ground White Hellebore, dusted over the trees while the foliage is damp, is a certain exterminator of the caterpillars. The following recipe is equally efficacious: Dissolve 1lb. of size in a gallon or two of hot water, and to this add 1lb. of Hellebore powder. When the water becomes nearly cold, mix thoroughly, and add enough cold water to make about sixteen gallons. Apply with a water-pot or syringe. At the end of a week, thoroughly wash off with clean water, as the powder is poisonous.

GOOSEBERRY OR MAGPIE MOTH (*Abraxas grossulariata*). This common and familiar moth (see (Fig. 126) is often mistaken for a butterfly. It usually appears about the middle of summer, and continues until autumn. Its wings have a white background, with numerous patches of black, varying much in size. At the base of the forewings is a yellow patch, and

Gooseberry or Magpie Moth—*continued.*

near the middle a band of yellow, between two rows of black spots. The colouring is, however, very variable. In the male, the antennæ are very slightly feathered, while in the female they are thread-like. The female deposits her eggs singly on the leaves of Gooseberry or Black Currant bushes, generally towards evening; and the fact that the eggs are so thoroughly distributed by the moth, sufficiently explains, apart from its mere fecundity, how the caterpillars are so difficult to eradicate. The eggs soon hatch, and the larvæ feed for from two to three weeks, and then lie secure within the folds of Gooseberry or Currant leaves, and pass a sort of torpid state of existence. When the

FIG. 126. GOOSEBERRY OR MAGPIE MOTH.

winter is past, the caterpillar emerges from its temporary lodging, and again sets about the process of eating. The grub, when full grown, is white and orange, with some conspicuous black bands at each joint. The chrysalis is of a black colour, having a few orange rings round the segments of the body. The caterpillars of this pretty moth are exceedingly destructive, and will soon defoliate a very large space, especially if the trees are on walls. Hand-picking is very practicable, the caterpillars being conspicuous. Toads and birds will also take them; but damage will be prevented by seasonable precautions. For remedies, *see* **Gooseberry and Currant Sawfly.**

GOOSE FOOT. A common name of **Chenopodium** (which *see*).

GORDONIA (named in honour of Alexander Gordon, a nurseryman contemporary with Philip Miller). Including *Polyspora.* ORD. *Ternstrœmiaceæ.* A genus comprising ten species of greenhouse or hardy trees, natives of North America, and of tropical and sub-tropical Asia. Flowers often showy; peduncles solitary, one-flowered. Leaves evergreen, entire or crenate. The hardy species are very handsome, and deserve careful culture; they thrive in a moist peat, or leaf mould and sand. The greenhouse species succeed in a similar compost, with ordinary treatment. Propagated by layers, or by imported seeds.

G. anomala (anomalous).* *fl.* cream-coloured, sessile, solitary, usually axillary. November. *l.* obovate-oblong, serrulated; upper ones entire. *h.* 3ft. Tropical and sub-tropical Asia, 1816. Greenhouse. (B. M. 4019, under name of *Polyspora axillaris.*)

G. grandis (great). *fl.* white, large; corymbs few-flowered, terminal. 1880. A very handsome greenhouse species, with leaves somewhat like those of the Cherry Laurel.

G. javanica (Javan). A synonym of *Schima Noronhæ.*

G. Lasianthus (hairy-flowered).* *fl.* white, 4in. across, fragrant; pedicels axillary. July and August. *l.* oblong, smooth, serrated, coriaceous. *h.* 8ft. to 10ft. (in England). North America, 1739. Hardy. (B. M. 668.)

G. pubescens (downy).* *fl.* white, with yellow filaments, fragrant, almost sessile, 3in. across; petals and sepals rather silky on the outside. August. *l.* obovate-lanceolate, pubescent beneath, somewhat serrated, membranous. *h.* 4ft. to 6ft. (in England). North America, 1774. Hardy.

GORSE. *See* **Ulex europæus.**

GOSSYPIUM (the Latin name used by Pliny). Cotton Plant. ORD. *Malvaceæ.* A small genus (comprising three species) of stove perennial herbs or shrubs.

Gossypium—*continued.*

Flowers yellow or purple, usually large and showy; calyx truncate or shortly five-fid. Fruit a three or five-celled capsule, bursting when ripe, and exposing the numerous seeds covered with down. Leaves three to nine-lobed, or rarely entire. Gossypiums thrive in a light rich soil. Propagated by seeds, sown in moist heat, in spring. The seedlings, when large enough to handle, should be planted singly in small pots, and transferred to larger ones as required. This genus is one of the most important of the whole vegetable kingdom, yielding, as it does, the well-known cotton of commerce.

G. Bahma (Bahma). This differs from other Cottons in its larger size, and its erect, almost unbranched habit. More cotton, too, is produced by it. Originated in Egypt, several years ago; said to be a hybrid between Egyptian Cotton and *Hibiscus esculentus.* (G. C. n. s., vii. 561.)

G. barbadense (Barbadoes). *fl.* yellow, with a purple spot at the base of each petal, finally turning reddish, large. September. *l.*, upper ones three-lobed; lower ones five-lobed. Stem smooth. *h.* 5ft. Barbadoes, 1759. (B. R. i. 84.)

G. herbaceum (herbaceous). *fl.* yellow, with a purple spot on the claw of each petal. July. *l.* five-lobed; lobes rounded, mucronate. *h.* 3ft. to 4ft. East Indies, 1594.

GOUANIA (named in honour of Anthony Gouan, 1733-1821, Professor of Botany at Montpelier). SYN. *Retinaria.* ORD. *Rhamneæ.* A genus containing about thirty species of usually evergreen stove scandent shrubs, of botanical interest only. They are natives of the forests of tropical America, Asia, and Africa. Flowers small, usually produced in clusters along leafless branches, forming slender spikes. Leaves alternate, petiolate, with veins running straight from the midrib to the margin. The species require a compost of peat and loam. Cuttings will root freely if inserted in sand, under a glass, in heat. The most interesting species of the genus is *G. domingensis,* the Chaw-stick of Jamaica.

GOURDS (*Cucurbita*). The species and varieties of Gourds are very numerous, and, as they readily cross-hybridise when growing near each other, it is somewhat difficult to keep the sorts distinct without having them isolated. Some have fruits highly coloured and very ornamental, and others produce them of an enormous size. From investigations made by M. Naudin, in France, where Gourds are more largely cultivated than here, the edible varieties have been referred to three species of *Cucurbita,* namely, *C. maxima, C. moschata,* and *C. Pepo.* The first-named includes the varieties with unfurrowed stalks and large broad leaves, such as the Large Yellow and Turk's Cap Gourds. Varieties with slightly-furrowed stalks, much enlarged near the fruit, deeply-lobed leaves, and rough seeds, are referred to the second species. *C. Pepo* comprises all the varieties with slender, deeply-furrowed stalks and deeply-lobed leaves with rough hairs; these include the Vegetable Marrow, Custard, Crookneck, and Orange Gourds. With the exception of the Vegetable Marrows, Gourds are cultivated in this country more as curiosities than for the value of their fruits for eating. Where the fruits of the very large sorts can be ripened before frost sets in, they may be cut, suspended in a dry, airy place, and kept for several months. The flesh is usually scooped or cut out, after being kept some time, and used in soups and stews, or baked, either alone or with apples, in pies. The fruits may also be cooked as a vegetable when young. All the plants are annuals, and hardy enough to succeed outside, in warm positions, from May until autumn. Many of them are vigorous-growing trailing subjects, that may be utilised—particularly the ornamental ones—for covering bare walls, hedges, unsightly fences, &c. Seeds should be sown in a gentle heat, in April, and the young plants afterwards grown on and hardened before being placed outside, about the end of May. Protection should then be afforded by handlights, until danger of frost is past, and the plants have become established. All the sorts

Gourds—*continued.*

require a rich soil, which should be placed above a large heap of manure; and any quantity of water may be applied to the roots in summer.

Sorts. The following are amongst the best in the sections representing large-fruited kinds and those of an ornamental character. The Apple, Pear, and Lemon Gourds are varieties having fruits more or less resembling those after which they are popularly named. Various ornamental *Cucurbitaceæ* not belonging to the genus *Cucurbita*, will be found under their proper headings. *See also* **Vegetable Marrow.**

Boulogne Grey. Fruit large; rind deep olive-green, towards maturity covered with a fine network of greyish lines; flesh yellow, thick and floury. According to Vilmorin, this was raised only a few years ago, at Boulogne-sur-Seine, but it is now widely grown, and is much esteemed by the market gardeners about Paris.

Chestnut Gourd. Fruit medium or small, depressed; ribs indistinct or altogether absent; rind smooth, deep brick-red; flesh deep yellow, very thick, sugary and floury. An excellent variety, of vigorous habit. SYN. Corfu Gourd.

FIG. 127. CROWN OR CUSTARD GOURD.

Crown Gourd, or **Custard Marrow.** Fruit scolloped at the edge, produced close to the stem. Plant compact; does not run on the ground. See Fig. 127.

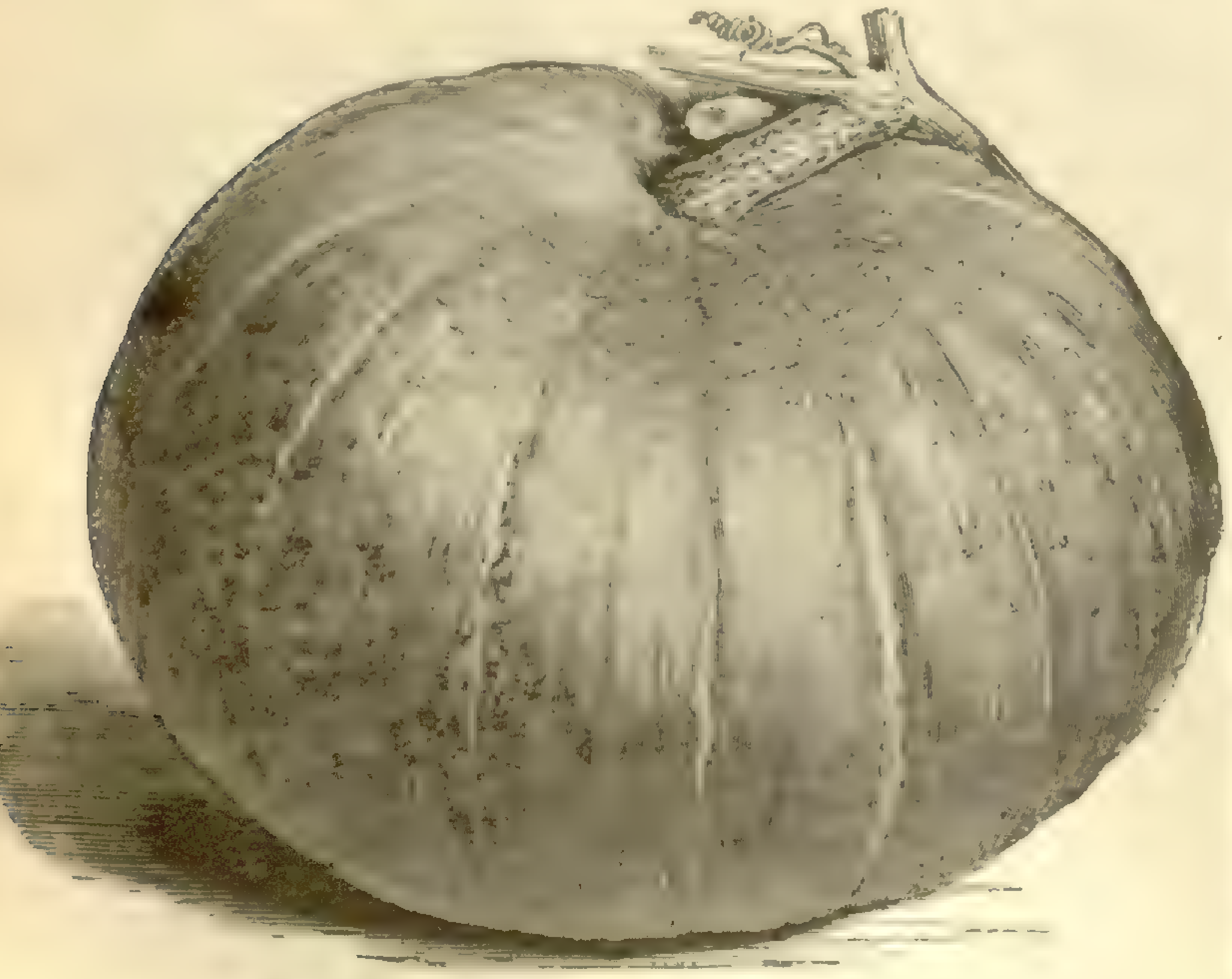


FIG. 128. LARGE YELLOW GOURD.

Egg-shaped. Fruit large, with a hard skin, of a reddish colour. A free-bearing, vigorous, trailing variety.

Embroidered Warted. Fruit small, with yellow flesh; skin beautiful yellow, covered with large excrescences. An exceedingly ornamental variety, but rather tender.

Green-striped Bergen. Fruit dark green and white striped, small. Of compact vigorous habit. Much cultivated in America.

Hubbard Squash. Fruit pointed, suddenly narrowed into the stalk; rind deep green, sometimes marbled with brick-red; very hard and thick, flesh deep yellow, very floury, not very sugary, and somewhat dry. In the United States, this is regarded as a variety of excellent quality. It is a good keeper. Habit vigorous.

Gourds—*continued.*

Large White. Fruit cream-coloured, very large with a smooth rind, more spherical than the Large Yellow. A very distinct variety. It is the *Potiron blanc gros* of the French.

Large Yellow. Flesh deep yellow. Stems very thick, running to a great length along the ground. The fruit is used in a ripe state, and has been grown to a weight exceeding 200lb. SYN. Mammoth Pumpkin. See Fig. 128. In the United States, a variety with a finer rind, but otherwise much resembling this, is cultivated under the name of Connecticut Field Pumpkin.

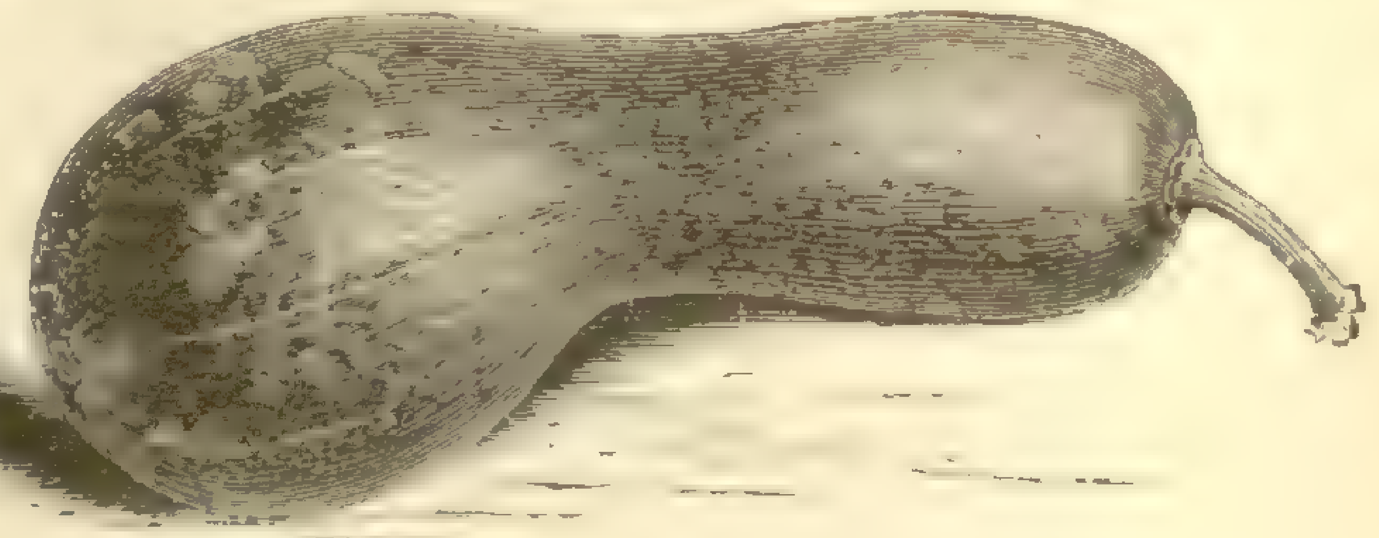


FIG. 129. NAPLES GOURD.

Naples Gourd. Fruit large, sometimes 1½ft. long; rind a deep green, turning yellow when thoroughly ripe, smooth; flesh perfumed, orange-yellow, sugary. A very productive variety. SYN. African Gourd. See Fig. 129.

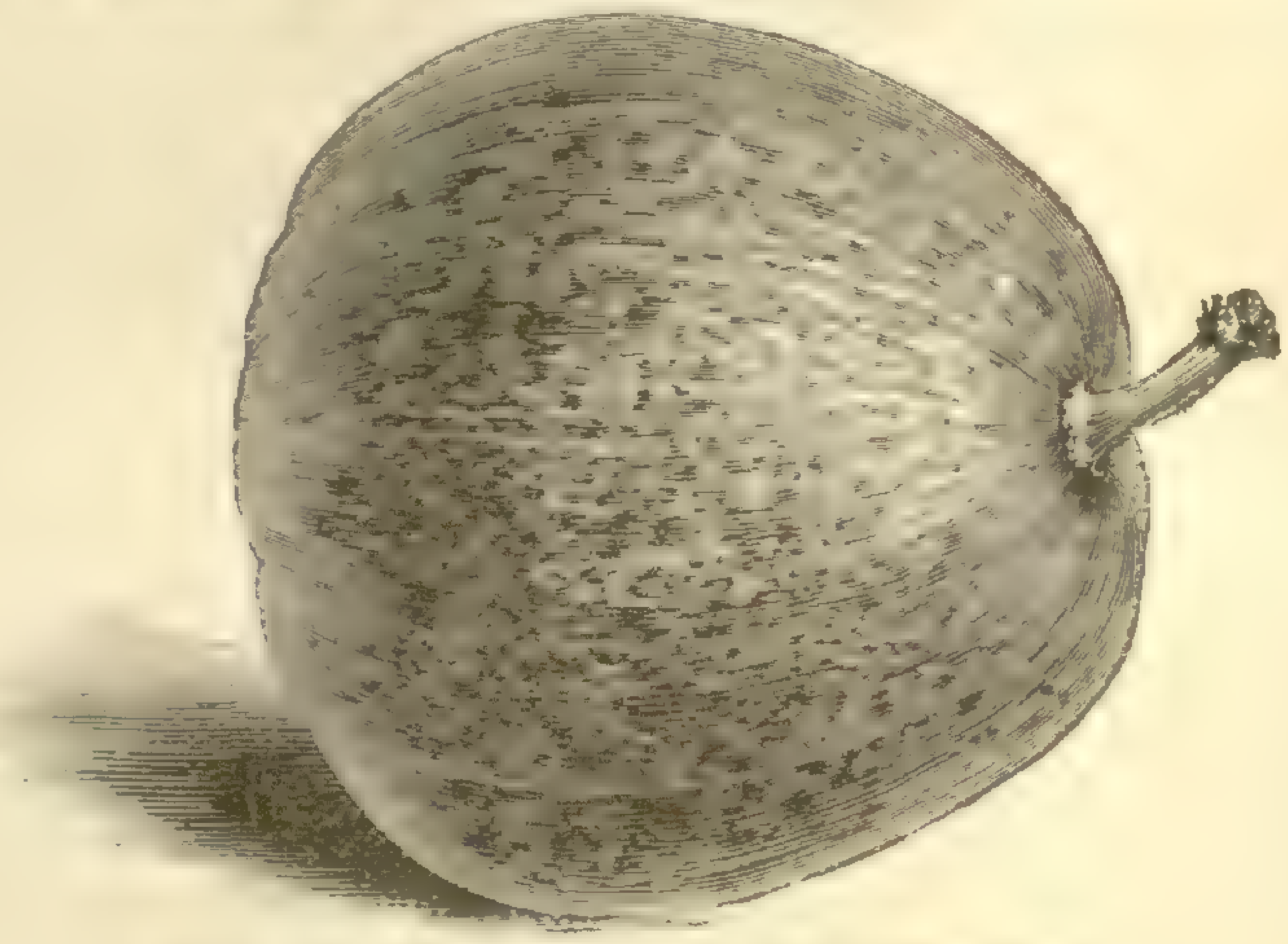


FIG. 130. NUTMEG GOURD OF MARSEILLES.

Nutmeg Gourd of Marseilles. Fruit nearly spherical in shape, flesh very red and highly musk-scented. See Fig. 130.

Ohio Squash. A fine-flavoured, heavy variety, that keeps well when ripe.

Olive Gourd. Fruit the form and colour of an unripe olive; rind thin, quite smooth; flesh yellow, firm, abundant. A strong grower.

Orange. Fruit resembling an orange in size, form, and colour. Bears abundantly, and is very ornamental.

Patagonian. Fruit large, oblong, sometimes tapering to each end; flesh yellow; skin deep green, frequently ribbed. Keeps well. See Fig. 131.

Red Etampes. Fruit medium-sized, prominently ribbed; rind bright orange-yellow. Habit of plant like the Large Yellow, but foliage paler in colour. This variety is one of the most popular amongst the growers who supply the Paris markets.

Spanish. Fruit green, flat, of medium size, firm, and of good flavour.

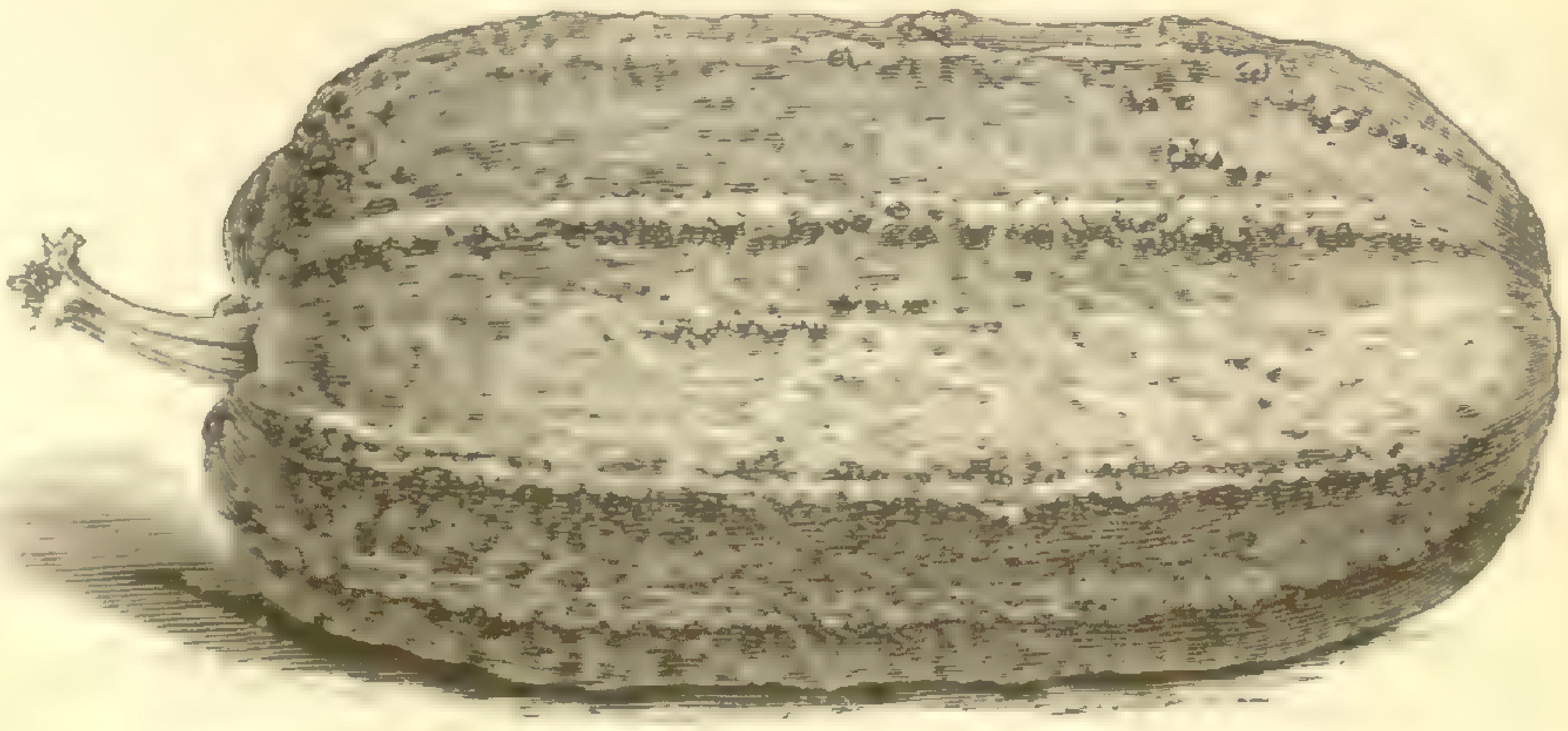


FIG. 131. PATAGONIAN GOURD.

Gourds—*continued.*

Summer Crookneck. Fruit bright yellow, small, with warty excrescences on the surface. Plant compact, does not run.

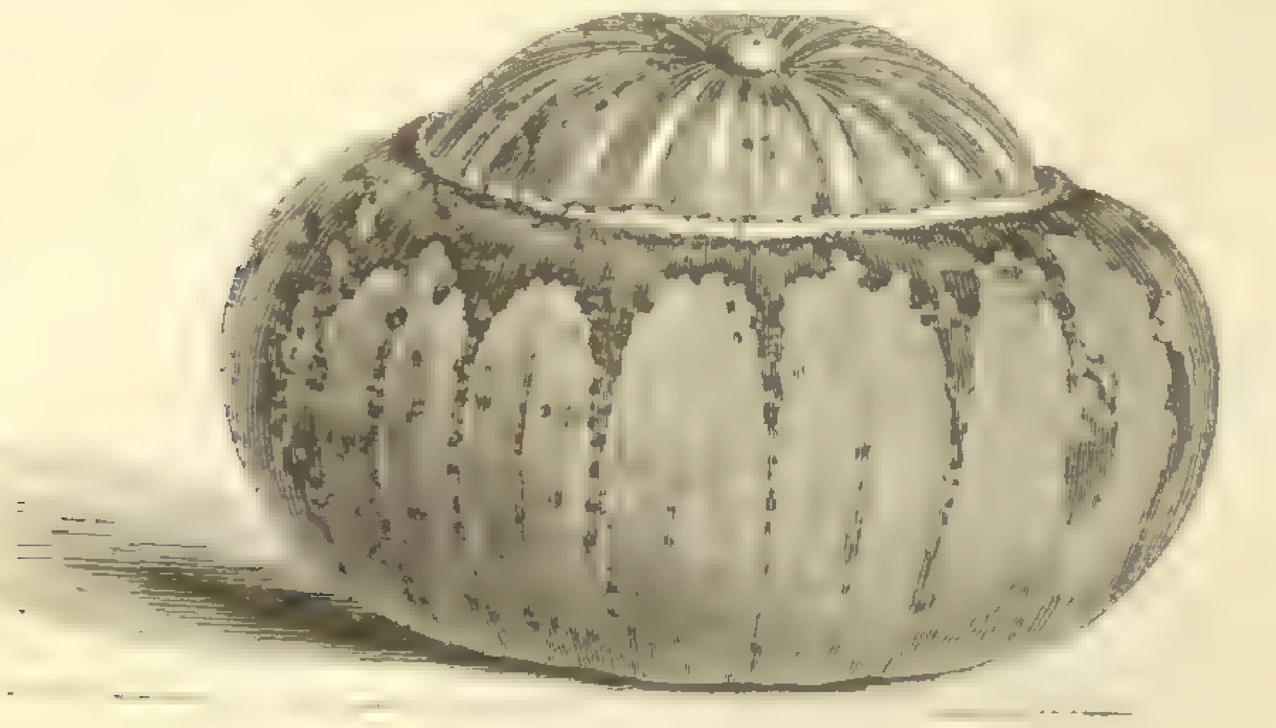


FIG. 132. TURK'S CAP GOURD.

Turk's Cap. Fruit pale green, flat, with rounded margin; centre elevated, of a deep green, marbled white and yellow; medium-sized, firm flesh. An ornamental variety. SYN. Turban Pumpkin. See Fig. 132.

Valparaiso. Fruit oblong, citron-shaped, sometimes 1½ft. long by 1ft. in diameter in its widest part; flesh orange-yellow, sugary; rind greyish-white, covered with a fine network when ripe. A strong grower, stems attaining a length of 4yds. or 6yds.

Winter Crookneck. Fruit pale yellow, solid, with long neck. A runner variety, and an abundant bearer. Much grown in America.

Yokohama Gourd. Fruit flattened, generally twice as broad as long, irregularly ribbed, very dark, almost black, green. (*Cucurbita melonæformis*, R. H. 1880, 137, 431.)

GOVENIA (named after J. R. Gowen, Esq., the raiser of some fine hybrid Rhododendrons, &c.). ORD. *Orchideæ.* A genus containing about sixteen species of stove terrestrial orchids, natives of tropical America. Flowers usually white or cream-coloured, but in some yellow, with or without blood-red spots; sepals and petals free, of nearly equal length; lip much shorter, without spur, entire, and jointed to the base of the column. About seven species have been cultivated; but, in all probability, those described below are the only ones now to be met with. For culture, *see* **Bletia.**

G. Andrieuxii (Andrieux's). *fl.* yellowish, white at base; lip white, spotted purplish-red in front, above yellow, barred with brown. Mexico, 1884.

G. deliciosa (delicious). *fl.* white, marked with small purple bars inside; lip nearly elliptic, apiculate, with dark brown spots in front. Mexico, 1884.

G. Gardneri (Gardner's).* *fl.* white, spotted, refracted after flowering; raceme elongated; sepals and petals ovate, bluntish; lip ovate, acute, naked, marked with five marginal spots and two convergent convex lines in middle; scape bluntly tetragonal, sheathed in middle. *h.* 2ft. Brazil, 1837. (B. M. 3660.)

G. utriculata (bladdery). *fl.* white; racemes elongated, many-flowered; sepals and petals curved, acuminated; lip oblong, ovate, acute. September. *l.* twin, broad-oblong, plicate. Pseudo-bulbs ovate, inclosed in a large, membranous, oblong-pellucid, striated, sheath. *h.* 1½ft. Jamaica, 1843. (B. M. 4151.)

GRABOWSKIA (named in honour of Mr. H. Grabowsky, an apothecary, and a botanical author, of Ohlaf, in Silesia, 1792-1842). ORD. *Solanaceæ.* A genus containing four or five species of hardy or half-hardy shrubs, natives of extra-tropical South America. Flowers pale violet. Leaves obovate or oblong, entire. The genus is nearly allied to **Lycium** (which *see* for culture).

G. boerhaaviæfolia (Boerhaavia-leaved). *fl.*, corolla pale dull blue, imbricate in æstivation; calyx fleshy, sub-regular, often broadly cleft. April. *l.* fleshy, glaucous. *h.* 6ft. Peru, 1780. A singular spiny scrambling shrub, sufficiently hardy to withstand our winters when planted in the open shrubbery border in the South of England, or against a south wall elsewhere. (B. R. 1985.)

G. duplicata (toothed). *fl.* axillary, fascicled, from the upper leaves; calyx tube short, hemispherical; limb of five spreading ovate-lanceolate segments; corolla greenish-white; tube straight, very hairy within. July. *l.* alternate, very broadly ovate, or almost orbicular, exceedingly glaucous, waved, entire, slightly attenuated at the base into a moderately short petiole. South Brazil, 1840. Half-hardy. (B. M. 3841.)

GRAFT. A small shoot or scion of a plant or tree, inserted on another plant, the stock, which supports and nourishes it.

GRAFTING is an art which has been practised from a period of remote antiquity; by whom it was discovered is unknown. The operation consists in placing two cut surfaces of one or of different plants under conditions which cause them to unite and grow together. The plant — usually termed the stock — on which the graft is inserted, should, in almost every case, be provided with roots, for the purpose of drawing and transmitting nutriment to support the graft after a union has taken place. The part inserted is called the scion, and is analogous to a cutting placed in the soil, although its growth is developed by nourishment supplied through the stock. The action of the one on the other is frequently marked and very important. Some fruit-trees, for instance, grow freely on one stock, but scarcely bear, whilst on others they produce abundant crops, though they do not grow so vigorously; nevertheless, although both are so intimately connected, they retain their individual characters distinct. The stock will become enlarged by the elaboration of sap in the leaves of the scion without the nature of the wood in either case being much altered, each part forming its own peculiar secretion from sap arising from the same source. Scions from variegated trees will frequently cause variegated shoots to develop on the stock far below the graft; and these can be used to increase the supply of a given form just as well as those produced by the original tree. The Golden Laburnum is a well-known case in point.

The importance of the possibility of Grafting cannot be over-estimated, as, by its adoption, the propagation of varieties of fruits, flowers, many forest trees, shrubs, &c., is rendered available, and the good qualities or habits of any are retained, without alteration, excepting such modifications as may be caused by the superior constitution or special suitability of the stock. Grafting may also be employed for restoring defective branches on any part of an otherwise healthy fruit-tree, or for the insertion of fruit-bearing wood, where there is a deficiency. Seedling fruit-trees are brought more quickly into a bearing condition by being grafted on fruit-bearing stocks, so soon as sufficiently-matured scions can be obtained. The two sexes of monœcious plants may, in some cases, be brought together on one stock in order to eventually insure their reproduction by self-fertilisation. Certain conditions are essential for attaining success in Grafting. A great deal depends on the skill of the operator, the condition of the sap, a healthy growth in the stock and scion, and the season when the operation is performed. In order that a vital union may take place, it is essential that the two parts employed should have a natural affinity to each other, either as varieties of the same species, species of the same genus, or genera of the same natural order. In the works of celebrated ancient writers, accounts are given of various attempts having been made, and supposed unions effected, under conditions which have since been found impossible, on account of a natural affinity being non-existent. A temporary union has sometimes taken place, but not a vital and lasting one. A fundamental principle, which applies to every method of Grafting, is the necessity of forming a direct communication between the layers of inner bark in each of the parts to be united; as, without this, a perfect joining is not effected. The pithy or woody parts never unite, as may be frequently observed when grafted trees of long standing are cut down, and the ends of wood originally placed in contact are found to have become decayed. Provided this essential principle be kept in view, the methods of Grafting may be varied almost indefinitely. The natural vigour of the stock and scion should be somewhat similar for inducing a steady growth; but, at times, it is preferable that the scion should be the

Grafting—*continued.*

hardier and more vigorous of the two. This is exemplified, and the desired results attained, in many cases, by Grafting various strong-growing varieties of Apples on the Paradise stock, Cherries on the Mahaleb, and Pears on the Quince. In these and other instances, the stock is restricted in its root-growth, and the supply of sap transmitted to the grafted portion is, consequently, limited. This latter condition tends to encourage fruit-bearing instead of vigorous wood, and proves, by results, the modifying effect of the stock and the superior results in productiveness thereby secured. Double-grafting is sometimes adopted as another means for reaching the same end, by having a variety of intermediate growth inserted first on the stock, this to be ultimately grafted with the

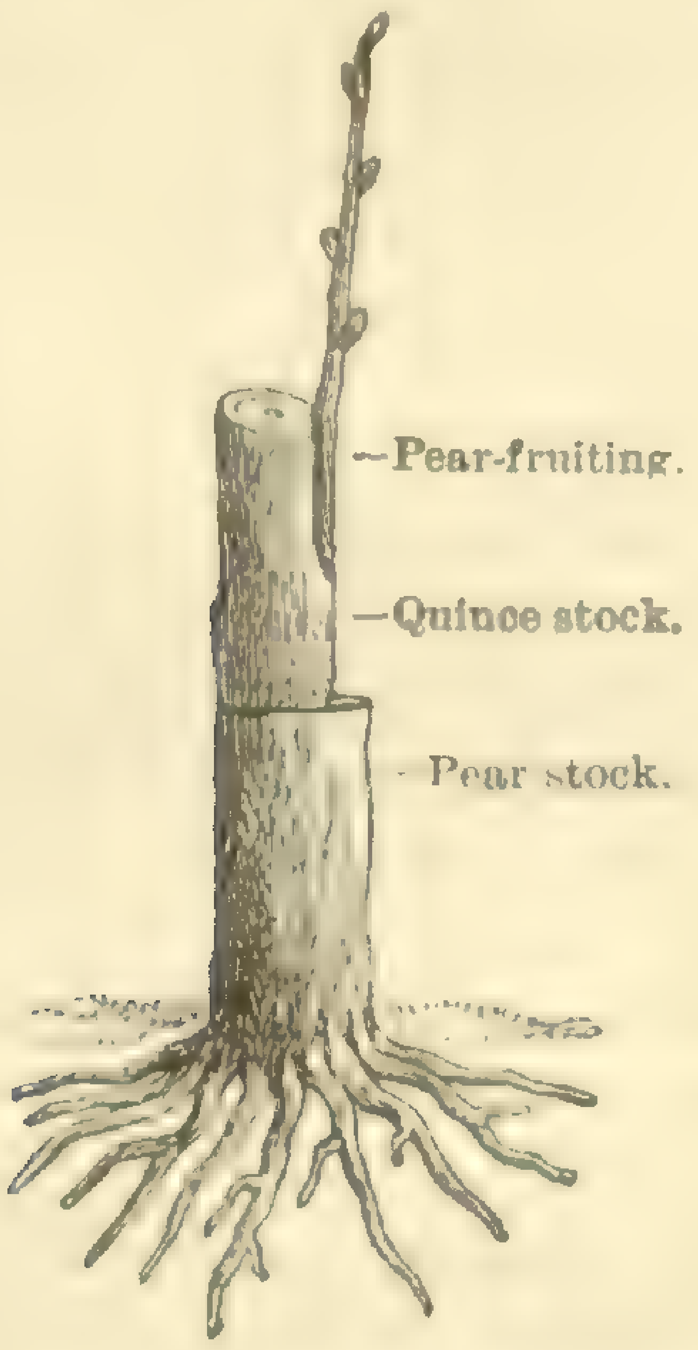


FIG. 133. DOUBLE-GRAFTING.

one it is intended to propagate. Fig. 133 is intended to illustrate what is here meant in the case of Grafting the Pear. The special influence exerted on the part of the stock or scion with certain varieties in either direction, can only be learned by experience. Grafting should be performed when the sap is in motion, between the time when it begins flowing in spring and a period before it ceases in autumn, avoiding the middle of summer, or any very hot weather. It is most largely practised, both indoors and outside, in early spring, the scions being slightly retarded by keeping them in a cooler place, or, in the case of fruit trees, previously cutting and inlaying them in the ground. Calm, moist weather is most suitable for the operation outside, which should always be skilfully performed, by means of clean cuts, a careful fitting of the parts together, and an exclusion of air by the application of grafting-clay or wax. Close frames or cool houses are requisite for tender plants, and for various evergreen trees or shrubs, until the parts have become united. Many of these do not require any clay or grafting wax, if kept moist, quite close, and shaded. Heat is unnecessary in the case of many hardy plants, a protection from the drying influence of wind and sun being all that is required. There are various methods of Grafting that may be successfully practised, according to the size or variety of subject it is intended to propagate or improve. The following are those most generally used, and all are subject to slight modifications under varied circumstances.

In Fig. 134, A shows the mode of tying the graft adopted with many fruit trees, and B the work completed by the application of clay, which should be left in the shape shown, and be carefully fitted to the stock and scion. This plan may be employed either for dwarf

Grafting—*continued.*

or tall stocks. All grafts inserted outside should be protected, and kept from moving by a stake, which

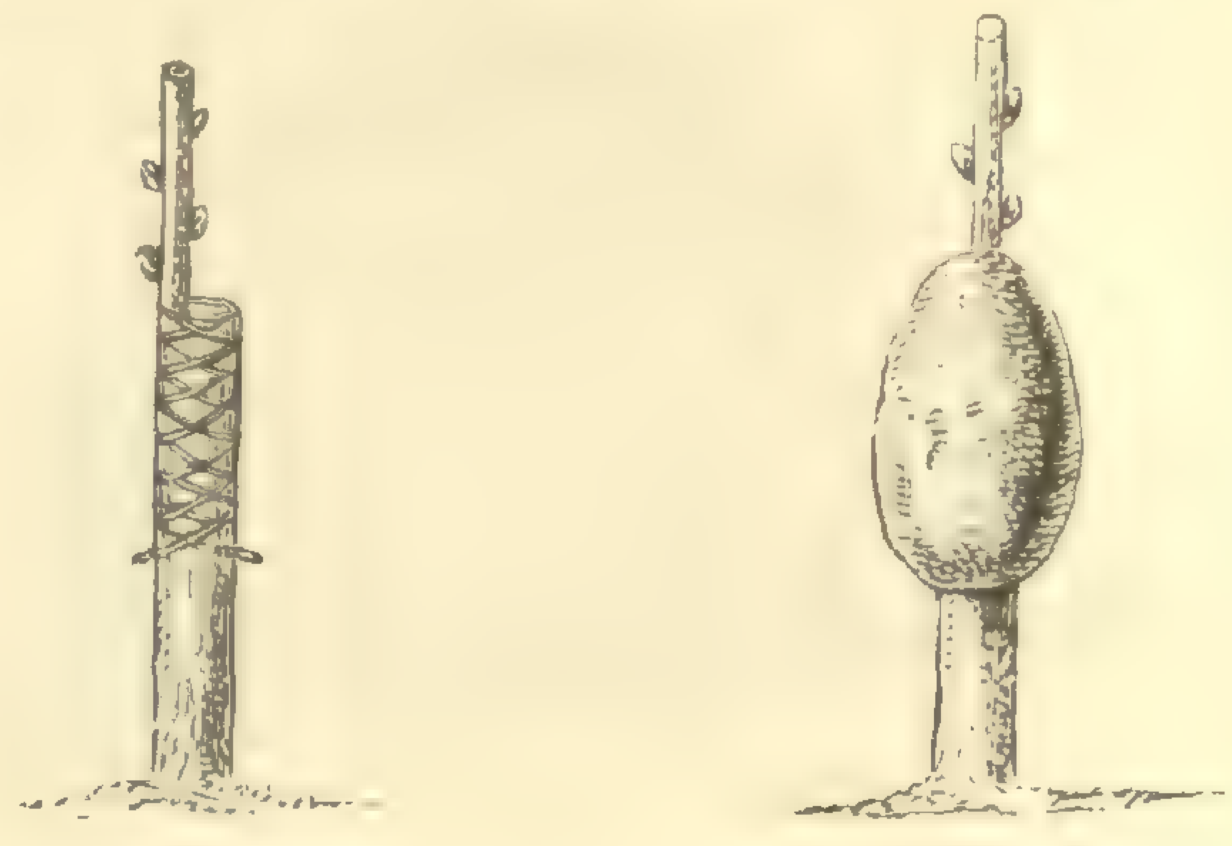


FIG. 134. MODE OF TYING AND CLAYING GRAFT.

should reach nearly or quite to the top, and have both

FIG. 135. MODE OF SUPPORTING THE GRAFT.

stock and scion secured to it, to prevent the latter becoming displaced (see Fig. 135).

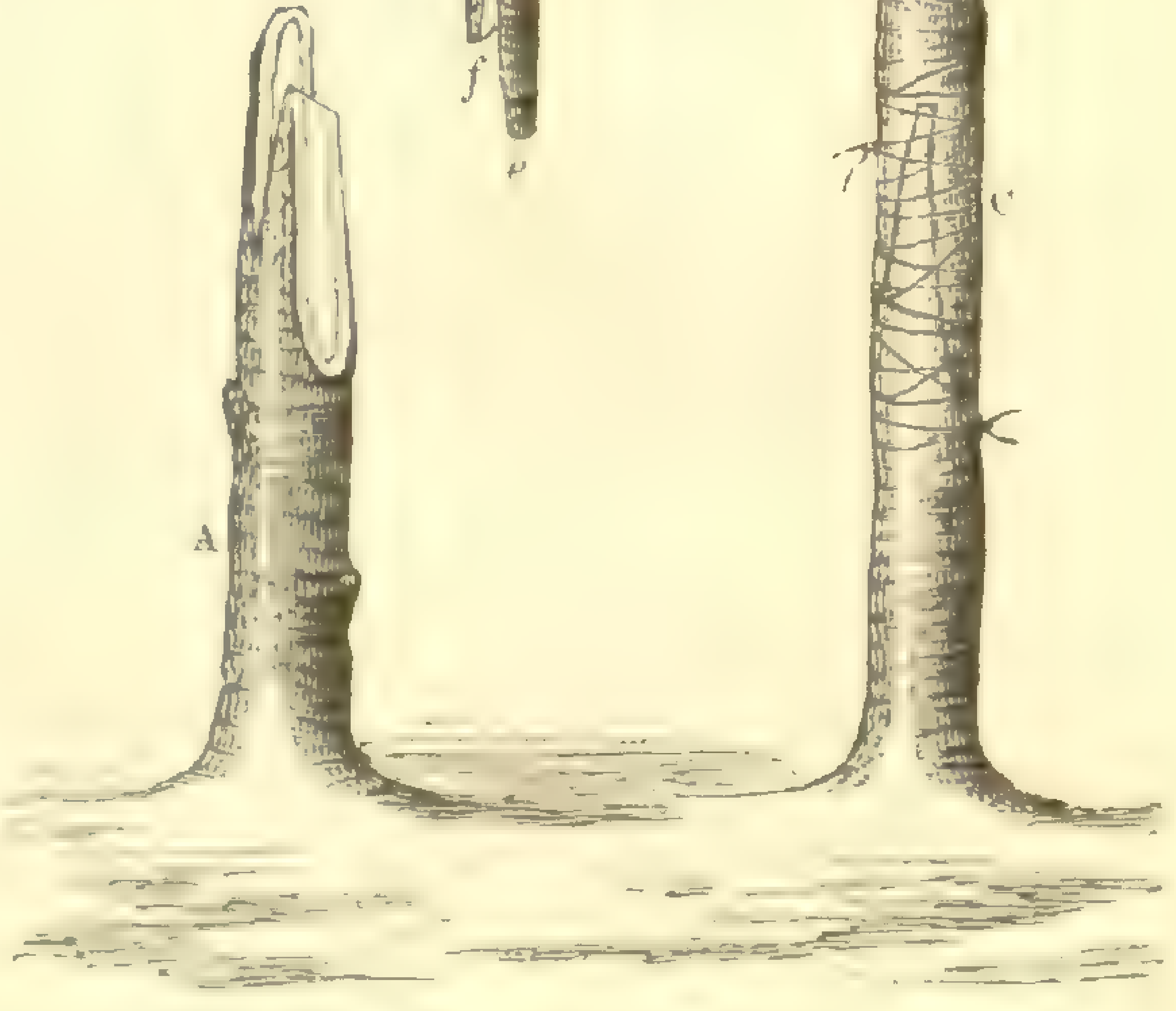


FIG. 136. WHIP OR TONGUE-GRAFTING.

Grafting—*continued.*

Whip, Splice, or Tongue-grafting. This is the best method, and the one generally and most extensively practised in this country. It is represented in Fig. 136, where A shows the stock, B the scion, and C the two fitted together and tied. Whip-grafting is easily performed, and is tolerably certain in its effects, provided the essential conditions be insured, and the work carefully executed. The stock should not be removed until the graft is ready to be inserted, in order that the parts may be quite fresh. It should be cut in a sloping direction, just above a bud if possible, as this sometimes prevents the old wood from dying back. The scion (B) should then be similarly cut through obliquely from *d* to *e*, allowing the latter point to be quite thin. Next, a thin tongue, *f*, must be cut in an upward direction, and the scion will then be ready for insertion. The stock should now be cut in a corresponding manner, so that the tongue fits in its place, and the inner barks come into direct contact with each other when pressed together. Where there is a difference in the sizes of the two parts used, the scion must be placed a little on one side, to insure a union being effected at some part of its surface. The notch should be kept open by the point of a knife until the tongue is properly inserted. When the exposed parts have been fitted as accurately as possible, they should be bound with a ligature of woollen thread, or material of a like description, to hold everything firmly in position, and at once covered with clay or grafting wax, for excluding air and preventing the sun and wind from drying up the sap.

Cleft-grafting. In this mode, which is a very objectionable one in many respects, the stock has to be split open by a chisel or other instrument, and the scion cut wedge-shaped, and fitted in the cleft, so that the inner barks may meet each other. The plan is largely adopted in some parts of the country for woody deciduous trees and plants with old stocks, which are split across, sometimes transversely each way, and two

FIG. 137. CLEFT-GRAFTING.

or more grafts inserted, according to the size (see Fig. 137). The objection is, that the wide cleft necessarily made in the solid wood can never unite again in the centre, although, after some time, it may be partially covered by the scions growing over. Another form of Cleft-grafting is shown in Fig. 138, where stock and scion are of the same size. This also has some objections, the stock having to be split and fitted with a wedge *a*, formed on the end of the scion. The cleft invariably extends beyond where it is intended the graft

Grafting—*continued.*

should reach, and, if this happens, the latter, when fitted, prevents that portion of the stock from again becoming united. The stock and scion should be prepared so that all the parts coincide.

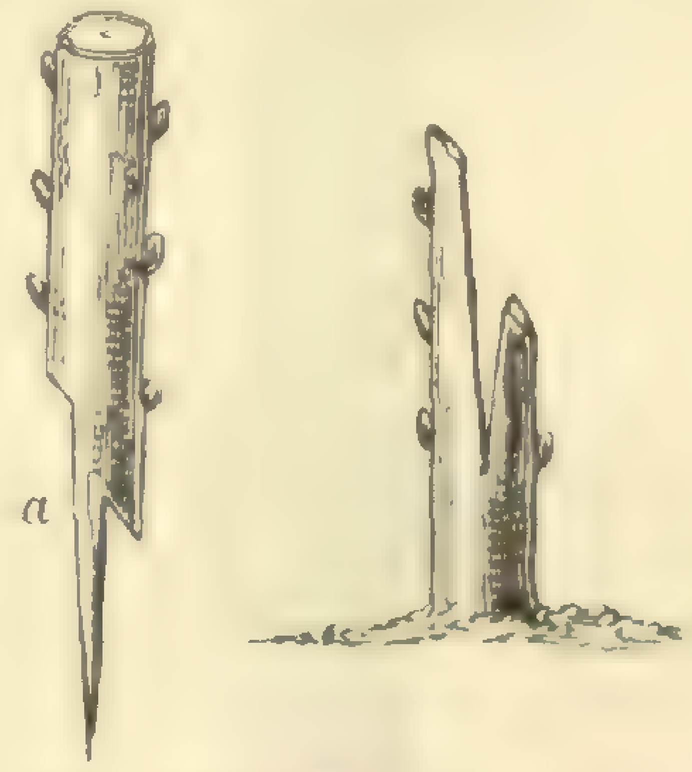


FIG. 138. CLEFT-GRAFTING.

Saddle-grafting. In Saddle-grafting, the stock and scion must, of necessity, be of nearly equal thickness, as the former is cut sloping on each side, like a wedge, and the latter is split up the centre and thinned, to allow of it fitting accurately on the top, as shown in the illustra-

FIGS. 139 AND 140. SADDLE-GRAFTING.

tions (see Figs. 139 and 140). It is important that the scion should not be split further than the end of the stock will reach, and the wood in both should be clean cut with a thin, narrow-bladed knife. For Saddle-grafting, the wood is usually young and vigorous; care must therefore be taken that the ligature is not made too tight at first, and that it is loosened afterwards before injury is caused to the bark. This method has been successfully practised for obtaining dwarf flowering plants of Rhododendrons by Grafting terminal shoots just before the flowering season arrives, and placing them in a close frame, without bandaging or anything beyond a tie. In Wedge-grafting, the positions of parts are reversed, the scion being made wedge-shaped, and fitted into an incision of similar shape and size cut in the stock (see Fig. 141).

Crown or Rind-grafting has advantages over Cleft-grafting, it being practicable to work stocks of considerable age and size without cleaving, and rendering the wood unsound. It is practised in spring, when the bark easily separates; and with this method it has been recommended

Grafting—*continued.*

that the stocks should be cut down a month beforehand, the cuts being again made fresh at Grafting time. The

FIG. 145. WEDGE-GRAFTING.

scion should be about 6in. long, with two or three eyes attached to the upper part. The lower half is cut in a sloping direction, the same as the splice-graft, and the notch or shoulder formed in cutting it is made to fit on the top of the stock. It is then inserted between the bark and wood, which readily separate, if in proper condition. One or more scions may be inserted, according

FIGS. 146 AND 147. CROWN OR RIND-GRAFTING.

to the size of the stem intended for their reception (see Figs. 146 and 147). The cut parts should be afterwards covered with a bandage, not made too tight, and clay or grafting wax. In what is known as Improved Crown-grafting, the top of the stock is cut obliquely, and the bark only raised on one side of the longitudinal cut made for the reception of the scion; the motive being to increase the points of contact between the two portions of bark, and accelerate their adhesion.

Side-grafting is employed for inserting scions without cutting away the head of the stock. It is useful for propagating plants, and also for supplying, where deficient, a branch or stem to any part of a tree (see Fig. 148). There are two systems of side-grafting: one, by placing a simple, or occasionally a tapering, branch under the bark, and the other, by inserting branches in clefts cut in the alburnum. A side-graft under the bark may either consist of a branch, having what is termed a shooting-bud, or it may possess one that is dormant. If the former is selected, a branch of the previous year forms the

Grafting—*continued.*

scion, which should be inserted about April, when the sap is flowing. Grafts with dormant buds are made from wood of the current year, and put in about August or September, to develop the following year.

FIG. 148. SIDE-GRAFTING.

The scion may be prepared for the side of an upright stock by making a long splice-cut in the lower part, taking care to render it smooth throughout, and thin at the point. Incisions, not penetrating the alburnum, are then made in the stock, and the scion inserted, in much the same manner as a bud, tied in, and covered with clay or wax. On horizontal branches, the stock may have a notch cut, and a portion of the bark raised under the tree (see Fig. 148, *a*), the scion *b* being prepared to fit, as shown at *c*. It will be observed that Double-grafting on established fruit-trees of inferior quality might be largely practised, if desired, by this method. Side-grafting in the alburnum, with an oblique or vertical cleft, is more especially adapted for evergreens, when the operation is performed, under glass, in February, or the latter part of summer.

Ordinary Veneer-grafting is principally employed for propagating various trees and evergreen shrubs, either in spring or autumn, the former preferred. The scion should be well ripened, either of the previous or current year, according to the time it is inserted, and the stock must be in a state of activity. In an evergreen scion, the leaves from the top are not removed. It must be cut with an even splice-cut, about 1in. long, and fitted on the side of the stock, previously prepared by having just the same quantity of bark, as far as the first layers of the alburnum, removed that the size of the cut portion in the scion requires. Both parts are then fitted without a cleft or incision being made in the wood; and, after being tied closely with a woollen or cotton bandage, are placed in close frames, with or without grafting wax. The stock should not be headed at first; when the parts have properly united, it may be gradually removed. This method answers well for Rhododendrons.

Grafting by Approach, or Inarching, is the oldest system known; examples being frequently seen in trees growing naturally together. It was formerly practised with trees, to form arches, doorways, &c., for picturesque effect, but is now more generally in use for propagating plants that do not succeed well under other methods. The season for Grafting by Approach begins with the flow of sap in the spring, and ends with it in autumn. The operation is performed when the leaves are on the plants forming the stock and scion, and they are allowed to remain on both for some time. The scion intended for Inarching must either be a movable

Grafting—*continued.*

pot plant (as shown in Fig. 145) that may be taken to any place desired, or one planted in close proximity to the stock. A similar portion of wood should be removed from both the parts intended for joining, and they must be carefully fitted together and secured with

FIG. 145. GRAFTING BY APPROACH.

tying material and a bandage. Sometimes, a tongue is cut in the plant forming the scion, and made to fit into a corresponding notch in the stock at the point where the barks meet. In other methods of Inarching, the stock is cut off and the scion inserted on or near its point; and for restoring defective parts, the terminal point of the scion is cut with a thin edge, as for a splice-graft, and inserted where required. Grafting by Approach is much practised with Vines for obtaining fruiting wood of any particular kind in a shorter time than would be possible by ordinary propagation. Some varieties also succeed better when grafted on a stock which is more vigorous than their own. After the cut portions heal and become established, the work of detaching them from their own roots, and removing the branches from the upper extremity of the stock, must be very gradually performed, to avoid extreme checks.

Herbaceous Grafting, as its name indicates, is applicable for increasing plants when still growing, but, at the same time, becoming solidified and passing into an herbaceous state. The system has been applied with success in Grafting the Melon on the Cucumber, the Tomato on the Potato, dwarf species of cacti on tall ones, &c. Its chief advantage, however, is in the increase of resinous trees, principally Pines, by inserting grafts on the points of commoner species, which may be used as stocks. The proper time for the operation is in May, when the young shoots are just beginning to grow, or else when growth stops and the shoots begin changing to a woody nature. Stock and scion should be, if possible, similar in texture. The former must be cut off just below the terminal buds, and nearly all the leaves removed from the point thus obtained. This should be carefully split, and the scion prepared wedge-shaped, and inserted rather deeply, allowing the barks to coincide, as in all other methods. Tie in with worsted, cover the cuts

Grafting—*continued.*

with grafting wax, and shade them from sunshine by paper caps until growth is resumed. The Walnut may be successfully propagated by terminal Herbaceous Grafting, employing shoots for both scion and stock that have not become woody. These trees may also be terminal-grafted in spring, just before growth commences.

Root-grafting is practicable with many plants, either on their own roots or on those of others, and a larger stock is obtainable of such as succeed than by any other method. Good roots should be secured as stocks when the plants bearing them are in a dormant state, and the grafts inserted, in most cases, when the sap begins to flow in spring. Large fleshy roots, such as Dahlias and Tree Pæonies, should have a notch cut in a triangular form, about 1½in. long, and the shoot or graft similarly

FIG. 146. ROOT-GRAFTING (DAHLIA).

prepared and made to fit therein (see Fig. 146). Other plants largely propagated by Root-grafting are Bignonias, Clematis, Hollyhocks, and Wistarias. Saddle-grafting on roots is sometimes employed.

GRAFTING CLAY. This consists of two parts clay and one of cow-dung. Some persons make an addition of finely-cut hay, as being of use in preventing the Clay from cracking and falling off. These ingredients should be beaten together, and thoroughly mixed, several weeks before being required for use, and be then occasionally turned and mixed again. If a cavity is made in the top of the heap, and filled with water, the whole bulk may be kept moist for a long time. Grafting Clay is an economical composition, most useful for excluding air and moisture until a union in the stock and scion is effected.

GRAFTING WAX. In grafting small or delicate plants, the use of clay is scarcely practicable, and various compositions of different substances have been prepared for answering the same purpose. It is essential that whatever is used should not be injurious to the cuts which have to be covered, either by drying or burning them up. Neither must it crack or run off under the action of natural heat and moisture. What is known as warm mastic is applied in a lukewarm state, by means of a small brush or broad wooden label. A good Grafting Wax for using lukewarm may be made of three parts each of resin and beeswax, and two parts of tallow; or these ingredients may be prepared in equal

Grafting Wax—*continued.*

proportions by melting all together in an iron pot over the fire, and afterwards allowing the composition to cool. Burgundy pitch and various other substances are sometimes used in compositions. An excellent preparation that may be purchased in tin boxes, and applied cold, is the French cold Grafting Wax, sold under the name of Mastic l'homme Lefort. This may be spread on the graft with a flat piece of wood, and it hardens by exposure to the air. Cold mastics are not so well suited for autumn grafting outside as warm ones, the frost sometimes having an injurious effect on the grafts through a soft substance. Grafting Wax may be applied to large as well as small plants, if desired.

GRAINS OF PARADISE. *See* **Amomum Granum Paradisi** and **A. Melegueta.**

GRAM, or **CHICK PEA** (*Cicer arietinum*). An annual herb, extensively cultivated in India for its seed, which, when ground, forms an important article of food.

GRAMINEÆ. A large order of annuals or perennials, usually herbaceous, cæspitose, rarely suffrutescent or arborescent. Flowers rarely diclinous monœcious, or diœcious, sometimes polygamous; spikelets in terminal spikes, racemes or panicles, usually composed of two flowers (empty), glumes inclosing or subtending one or more, sessile or stalked, normally flower-bearing (but sometimes also empty) glumes, which are distichously arranged on a slender rachis (*rachilla*); flowering glumes boat-shaped, inclosing the flower and a flat, often two-nerved, scale (*palea*); perianth of two (rarely none, or three or more) minute scales; stamens three (rarely one, two, six, or more), with capillary filaments and two-celled pendulous anthers. Leaves alternate, distichous, springing from the nodes; petiole dilated, convolute, sheathing the stem; margins free, or very rarely more or less united; blade entire, usually narrow-linear, sometimes oblong or oval; margins very often scabrid; nerves parallel; stipule axillary, adnate by its dorsal face to the sheath, and produced as a membranous tongue (*ligule*). The order is widely distributed over the world. "Gramineæ contain in their herbage, and especially in their seeds, nutritious principles, which entitle them to the first rank among plants useful to man, and which are of the greatest importance in an economic and political point of view. The Cerealia are: Wheat (*Triticum sativum*), Rye (*Secale cereale*), Barley (*Hordeum vulgare, distichum*, &c.), Oats (*Avena sativa*), all cultivated by the Caucasian race in the Northern and temperate regions. Rice (*Oryza sativa*) and Millet (*Panicum miliaceum*) originated amongst the Asiatic races. The Sugar-cane (*Saccharum officinarum*) is, in all probability, a native of tropical Asia; it has been cultivated from very ancient times in the East Indies. A considerable number of Gramineæ are medicinal, viz., *Triticum repens, glaucum, junceum, Cynodon Dactylon, Andropogon bicornis, Arundo Donax, Calamagrostis*, &c." (Decaisne and Le Maout). This order likewise furnishes numerous ornamental garden plants, some of the most striking of which are *Arundinaria falcata, Metake, Arundo Donax* (the Provence Cane), *Arundo mauritanica, Bambusa arundinacea, Gynerium argenteum, Panicum plicatum, Phalaris arundinacea*, &c.

GRAMMANGIS (from *gramma*, writing; probably in allusion to the markings of the flowers). ORD. *Orchideæ*. A genus comprising two species of stove epiphytal orchids, one of which is from Madagascar, the other from Java (?). Flowers showy, on long pedicels; racemes loose, many-flowered; bracts small; scape simple. Leaves few, long, coriaceous, veined. Pseudo-bulbs oblong or fusiform, fleshy. For culture, *see* **Saccolabium.**

G. Ellisii (Ellis's). *fl.* numerous: sepals yellow, with several transverse brown stripes; petals and lip whitish; spikes very graceful, bent over, produced from the base of the pseudo-bulbs along with the young growths. Summer. *l.* broad, ligulate, blunt, glaucous. Pseudo-bulbs about 6in. long, square. Madagascar. (B. M. 5179, under name of *Grammatophyllum Ellisii.*)

G. Huttoni (Hutton's).* *fl.* shortly pedicellate, 1½in. in diameter; racemes ten-flowered, pendulous; sepals recurved, obovate, acuminate, pale brown externally, internally studded with transverse, small, short, chocolate streaks; petals smaller, but similar in form and direction, dark chocolate inside; lip sub-sessile, lateral lobes obtuse, greenish, striped with chocolate; scape from the base of the pseudo-bulbs, stout. June. *l.* narrow-oblong, obtuse, very coriaceous, nerveless, dark green. Pseudo-bulbs elongate-ovoid, with straight sides, compressed, grooved, green. Java, 1867. (B. M. 5676, under name of *Cymbidium Huttoni.*)

GRAMMANTHES (from *gramma*, writing, and *anthos*, a flower; in consequence of the petals having some supposed resemblance to the letter V marked on them; hence its synonymous name of *Vauanthes*). SYN. *Vauanthes*. ORD. *Crassulaceæ*. A very pretty half-hardy annual. It thrives in a peaty or light sandy soil, and forms an excellent subject for rockwork. Seeds should be sown in a warm greenhouse, during March, and the seedlings transferred when large enough. Plenty of air, and care in watering, are important features in the culture of this plant.

G. chloræflora (yellow-flowered).* *fl.* at first orange-yellow, finally more red, with a deep V-shaped mark at the base of each corolla lobe; corolla tube equalling the calyx or longer; axillary and terminal lobes ovate or lanceolate, acute. July. *l.* sessile, ovate, acute, succulent, concave. *h.* 4in. to 5in. South Africa, 1774. A glaucous herb. (B. M. 4607.)

G. c. cæsia (greyish). This only differs from the type in its smaller, less brightly coloured flowers, and more glaucous leaves. (B. M. 6401.)

GRAMMATOCARPUS (from *grammata*, letters, and *karpos*, fruit; in reference to the markings of the fruit). SYN. *Scyphanthus*. ORD. *Loaseæ*. A monotypic genus, the species being a half-hardy, twining, pubescent, annual herb, allied to **Loasa** (which *see* for culture).

G. volubilis (twining).* *fl.* yellow, axillary, sessile; calyx tube linear-elongate; lobes five, spreading, linear-spathulate; petals five, saccate. Summer. *l.* opposite, bi- or tripinnatisect. Chili. (B. M. 5028; S. B. F. G. 238.)

GRAMMATOPHYLLUM (from *grammata*, letters, and *phyllon*, a leaf; in reference to the markings on the leaves). ORD. *Orchideæ*. A genus of three or four species of rather large-growing, handsome stove epiphytal orchids, usually very shy of flowering. All are natives of the Malayan Peninsula and Archipelago. Grammatophyllums should be cultivated in large pots, filled with peat. Good drainage and a liberal supply of water, when the plants are in a growing state, are essential elements in their culture. After a few strong growths have been made, the plants should be allowed a season of rest. Propagated by divisions of the pseudo-bulbs. The undermentioned are the only species in general cultivation, and these are still very rare.

G. multiflorum (many-flowered).* *fl.* green, brown, purple; racemes long, many-flowered; bracts oblong, scale-formed; sepals oblong, obtuse; petals similar, acute, narrower; lip three-lobed, downy; middle lobe oblong, rounded; lateral ones erect, subfalcate, with four elevated lamellæ in middle. Summer. *l.* linear, distichous, striated. *h.* 2ft. Manilla, 1838. (B. R. 1839, 65.)

G. m. tigrinum (tiger-spotted). *fl.* yellow, spotted with purple. Summer. *h.* 2ft. East Indies, 1840. (B. R. 1842, 69.)

G. speciosum (showy).* *fl.* nearly 6in. across; sepals and petals undulated, ovate-oblong, rich golden-yellow, spotted with purple; lip three-lobed, streaked with red; scape often nearly 6ft. long, growing from the base of the stem. Winter. *l.* distichous, lorate, acute, 1½ft. to 2ft. long. Stems sometimes 9ft. to 10ft. high. Java, 1837. One of the most elegant plants in cultivation. (B. M. 5157.)

GRAMMITIS. *See* **Gymnogramme** and **Polypodium.**

GRANADILLA. A name given in the West Indies to the fruits of different species of the genus **Passiflora** (which *see*).

GRANULAR. Divided into little knobs or knots; *e.g.*, the roots of *Saxifraga granulata*.

GRAPE. The well-known fruit of the Vine, **Vitis vinifera** (which *see*).

GRAPE HYACINTH. *See* **Muscari.**

GRAPE OR VINE LOUSE (*Phylloxera vastatrix*). This insect belongs to the Aphides, or Green Flies, a group that contains many species very destructive to field and garden crops, but none which approaches this in the injuries done by it. The insect lives on the European Vine (*Vitis vinifera*), forming galls on both roots and leaves; and, when it has once effected a settlement, the plant, if left to itself, soon perishes under the attacks. The injuries to the leaves are of comparatively slight moment; the danger proceeds from the effects produced on the young roots. The insects frequently affix themselves near the tips of newly-formed roots, and push their probosces through the bark, it may be even to the cambium. There results from this a thickening of the bark, due to the development of new cells—hence the formation of galls, some of which reach the size of a pea; and, after a time, the central part of the root also becomes modified. In autumn, the healthy young roots begin to undergo enlargement, to form the older ones of the next year; but, in those affected, the galls die, and the roots also perish. The plants are thus deprived of due nourishment, and are starved; while, at the same time, they are weakened by the abstraction of food by the insects on the older roots and leaves. *Phylloxera vastatrix* passes the winter on

FIG. 147. GRAPE OR VINE LOUSE.

the roots. In spring, the plants push out young branches and leaves, but these soon become yellow, and wither; and the fruits, if they ripen, often remain uncoloured and sour. The next year, the leaves are still more deformed; and fruits are not formed, or do not ripen. The insects leave the Vines before the latter are quite dead, and crawl about in search of new plants. Hence, any diseased plant is a dangerous centre of infection in a vinery. The insects vary in appearance. Eggs laid, in the autumn, between the crevices of the bark on the roots, produce, in spring, larvæ, which pass, with little change, except mere increase in size, into the mature females. These larvæ usually form galls on the leaves, but, at times, the roots alone are attacked. The leaf-galls form small reddish warts on the one surface of the leaf, with small depressions on the other surface. In this depression is the entrance to the gall—a slit, closed with hairs. From the leaf-galls emerge wingless insects, which continue for a time to form new galls, and at last pass down to the roots.

In Fig. 147, A shows sketch of a Vine root attacked by phylloxera; B, portion of leaf of Vine, showing the galls formed on the leaf by the Phylloxera, as seen both on

Grape or Vine Louse—*continued.*

upper and under side; and C, subterranean form of female, magnified. The eggs are about $\frac{1}{80}$in. long. The mature female may reach $\frac{1}{25}$in. in length, and varies in colour from pale yellow to dull brown. The males become winged when mature; the body is about $\frac{1}{24}$in. or $\frac{1}{25}$in. long; the wings are nearly twice as long as the body. The colour is golden-yellow, or approaches dull orange, except a dark band across the thorax. The eyes are red in both sexes.

History. The disease of Vines caused by Phylloxera was first noticed in 1863, in Southern France, but did not seem very dangerous till 1865. Planchon, in 1868, discovered that it was caused by the insect, which, however, had been previously known to zoologists. In 1856, Dr. Asa Fitch observed it in America, and named it *Pemphigus vitifoliæ.* In 1863, it was discovered in vineries near London, and was named by Professor Westwood *Peritymbia vitisana.* In France, it spread very rapidly, even till it reached the most northern vineyards. In the department of Vaucluse, the yield of wine had, in 1876, been reduced to about one-tenth of the former amount. The disease still spreads, and has appeared in most countries of Western and Central Europe.

The effect of the legislation which the dread of the Phylloxera has brought about, seriously interferes with the nurserymen who export plants. In some countries—Germany, for example—no plants are allowed to be imported. An exception in this case, we believe, is made in favour of "bulbs;" but plants equally unlikely to be in any way the means of furthering the spread of the Phylloxera, are rigidly refused admission. In order to send plants to any of the countries in which the regulations of the Phylloxera Convention are enforced, it is necessary to sign a declaration that the package contains no Vines or roots of Vines, that no Vines are grown near the place whence the plants were taken, and that no Phylloxera exists, or has existed, in the immediate neighbourhood. This declaration must be stamped and countersigned by a magistrate, and afterwards be presented to the Consul or Vice-Consul of the country to which it is proposed to send the package, for his *visé.* The fee for the latter varies almost for every country. The declaration is then handed to the agent or railway company who undertake to forward the plants: without it, the goods are not allowed to be sent to their destination.

Remedies. These fall almost entirely under the head of "Prevention of the Spread of Disease," which has been attempted in various countries by strict prohibition of the export of Vines from infected districts, and of the import of Vines into places where disease has not yet appeared (the German law of 11th Feb., 1873, is especially strict in this matter). It has also been attempted by the destruction of the Vines wherever disease has appeared. The German law of 6th March, 1875, enforces the thorough uprooting of infected plants, burning every part, and a disinfection of the soil, for which many substances have been used—the most reliable, however, is carbon disulphide, which destroys the insects on the roots, but does not injure the plants, especially if applied in winter. A mixture of carbon disulphide and coal-tar has also been advised; and a good mode of using it is to scatter on the soil pieces of wood saturated in the mixture, and washed with water-glass (silicate of potash), so as to allow the gases to pass off gradually as the latter dissolves. Another method is, where easily practicable, to lay the soil under water for six or seven weeks. The American Grape Vines, especially *V. cordifolia* and *V. aestivalis*, resist the attacks of Phylloxera far better than do the European species; and, of late years, they have been largely introduced into European vineyards, for the purpose of supplying stocks on which to graft the better flavoured, but more delicate, Old World varieties. ("Enquète de l'Académie des Sciences sur le Phylloxera." Paris, 1879. 2 vols., with many plates.)

GRAPE PEAR. *See* **Amelanchier canadensis.**

GRAPE PHYLLOXERA. *See* **Grape or Vine Louse.**

GRAPE, SEASIDE. *See* **Coccoloba.**

GRAPHOLITHA PISANA. *See* **Pea Moth.**

GRAPPLE PLANT. *See* **Harpagophytum procumbens.**

GRAPTOPHYLLUM (from *grapho*, to write, and *phyllon*, a leaf; referring to the markings on the leaves). SYN. *Earlia*. ORD. *Acanthaceæ*. A genus comprising four or five species of ornamental stove evergreen glabrous shrubs, natives of Australia or the Pacific Islands. Flowers red, shortly pedicellate. Leaves opposite, entire or (in one species) spinose-dentate, generally spotted. The plants thrive in a compost of peat and loam. Cuttings of rather firm young shoots, taken with a heel, will root, if inserted in sand, under a bell glass, in heat.

G. Earlii (Earl's). *fl.* of a rich red, solitary in the axils, or in clusters of very few. *l.* oblong-elliptical, acute or mucronulate, entire, or with a few very small acute teeth. *h.* 10ft. to 15ft. A beautiful glabrous shrub or tree. Australia. SYN. *Earlia excelsa.*

G. hortense (garden).* Caricature Plant. *fl.* crimson, inflated at the throat, whorled, in axillary and terminal racemes. July and August. *l.* elliptical, variegated. 1780. (B. R. 1227, under name of *Justicia picta.*) This species—its native country is unknown—is largely cultivated throughout the tropics for the beauty of its foliage. A variety, with purplish leaves and blood-coloured veins, is figured in B. M. 1870, under name of *Justicia picta lurido-sanguinea.*

G. medio-auratum. A synonym of *Aphelandra medio-aurata.*

GRASSES, ORNAMENTAL. Numerous annual species of Grasses are cultivated, for the double purpose of rendering mixed flower or shrubbery borders attractive in summer, and for the use of the spikes or panicles, in a dried state, intermixed with everlasting flowers, or arranged separately in vases by themselves, in winter. A few perennial species are equally attractive for similar purposes, notably *Arundo conspicua*, *Gynerium argenteum* (Pampas Grass), and *Stipa pennata* (Feather Grass). The annuals may be sown in any soil outside, in March or April; and if the spikes are intended for drying, they should be gathered on fine days before the seeds ripen, and gradually dried in a cool place. A selection of the best and most ornamental would include *Agrostis elegans*, *nebulosa*, and *pulchella*, *Briza maxima* and *minor*, *Bromus brizæformis*, *Eragrostis elegans*, *Hordeum jubatum*, and *Lagurus ovatus*. It is advisable to treat many of the annual species as biennials; that is to say, sow the seeds in July or August. This is too late to allow the plants to flower the same year, but they make finer clumps, and produce larger spikes, the following season.

GRATIOLA (a diminutive from *gratia*, grace; referring to its medicinal virtues). Hedge Hyssop. SYN. *Sophronanthe*. ORD. *Scrophularineæ*. A genus containing about twenty species of pretty free-flowering hardy herbaceous plants, mostly natives of Central Europe, North America, and extra-tropical Australia. Corolla often white or pale, tubular; limb two-lipped, the upper lip notched or cleft into two divisions, the lower three-cleft. Leaves opposite, entire or dentate. Gratiolas thrive in a rich, moist soil. Propagated readily by dividing the roots, in spring.

G. aurea (golden).* *fl.* golden-yellow; peduncles hardly the length of the leaves. May. *l.* broad-linear, sessile, toothed, dotted above. Stem branched at the base. *h.* 4in. North America, 1828. (L. B. C. 1399.)

G. carolinensis (Carolina). A synonym of *G. virginiana.*

G. officinalis (official).* *fl.* whitish, striated with purple, pedunculate. May. *l.* lanceolate, serrated. *h.* 1ft. Europe, 1568.

G. pilosa (pilose). *fl.* white; corolla three or four lines long, little exceeding the calyx; tube oblong. July. *l.* ovate or ovate-lanceolate, sparingly and acutely denticulate, closely sessile by a broad base. Stem 1ft. to 2ft. high, from an apparently annual root. North America, 1827.

G. quadridentata (four-toothed). A synonym of *G. ramosa.*

G. ramosa (branched). *fl.* white; sepals linear (two or three lines long), half the length of the corolla. May to August. *l.* lanceolate or linear-lanceolate, acute, serrate with sharp coarse teeth, equalling or shorter than the pedicels. *h.* 9in. North America, 1821. SYN. *G. quadridentata.*

G. virginiana (Virginian). *fl.*, corolla four or five lines long; tube yellowish, barely twice the length of the calyx; lobes nearly white, the two upper emarginate. August. *l.* commonly glabrous, oblong-lanceolate, acute, from entire to denticulate-serrate, mostly narrow at the base. *h.* 6in. to 9in. North America, 1759. SYN. *G. carolinensis.*

GRAVESIA (named in honour of C. L. Graves, a writer on the plants of Northern France; he also collected in Madagascar). ORD. *Melastomaceæ*. A genus containing a couple of species of dwarf stove herbs, natives of Madagascar. Flowers disposed in few-flowered umbellate cymes; scape solitary, erect. Leaves petiolate, subradical, ovate-oblong, membranaceous, sub-serrate, five-nerved. For culture, *see* **Bertolonia.**

G. guttata (spotted).* *l.* ovate, 3in. to 6in. long, 2in. to 3in. wide; ground colour rich dark green, profusely dotted with rose-coloured spots arranged in lines. 1864. (B. M. 5524, under name of *Bertolonia guttata.*) The best varieties are:

G. g. margaritacea (pearly).* *l.* ovate-acuminate; upper surface dark olive-green, faintly shaded with purple, with pearly-white spots in regular lines; under side bright pink. 1862. SYN. *Bertolonia margaritacea.*

G. g. superba (superb).* *l.* cordate-ovate, acute, greenish-olive, thickly spotted with rather large circular spots, interspersed among which are very minute dots of the same colour. SYN. *Bertolonia superbissima.*

Other varieties are: *albo-punctata* (white-dotted) and *roseo-punctillata* (rosy-dotted).

GRAY PLUM. The fruit of **Parinarium excelsum** (which *see*).

GREAT BURNET. *See* **Poterium officinale.**

GREEN DRAGON. *See* **Arum Dracontium,** the proper name of which is *Arisæma Dracontium.*

GREEN FLY. *See* **Aphides.**

GREENGAGE. A delicious variety of **Plum** (which *see*).

GREENHEART. *See* **Nectandra Rodiæi.**

GREENHOUSE. A Greenhouse is usually understood to be a structure specially devoted to the cultivation or exhibition of plants that never require a very high temperature. It is distinguished from a conservatory by the occupants being almost exclusively grown in pots and tubs; whereas, in the other instance, many are permanently planted out. Greenhouses have a wide application, ranging from a single house possessed by an amateur, to a large structure set apart for the exhibition of plants that are previously grown to the flowering stage in other houses or pits. Subjects which are available for Greenhouse decoration throughout the year, are almost innumerable, and include a large proportion of the most beautiful plants in cultivation. An important essential for their general well-being is plenty of light; consequently, this is one of the first structural conditions to be secured. Secondly, provision should be made for admitting any quantity of air whenever required, as is the case throughout the summer. The best houses of modern construction are far before those of former years in these respects, the general substitution of large for small panes of glass, and glass roofs for slates, having effected great improvements. In well-arranged Greenhouses, where sufficient plants are at command, a fine display may be insured throughout the year by having a varied selection, and hastening and retarding to keep a succession. Nearly all the improved types of florists' flowers and select annuals are available for pot culture if desired. Exotic plants are extremely numerous and attractive, particularly those from Australia, the Cape of Good Hope, the Himalayas, China, and Japan. Many hardy flowering plants and shrubs may also be lifted from the open ground and forced in early spring—a time when Greenhouses are better furnished and more interesting than at any other season of the year. Where there are other houses and pits devoted to the preparation of flower-

Greenhouse—*continued.*

ing plants, each subject may be much better provided with its special requirements, than when space for cultivation is limited to the Greenhouse only. Here a certain temperature is maintained which suits a number of plants in flower, but may not be warm enough for others that are making their annual growth. If one house can be devoted more especially to the exhibition of those plants in flower and others with ornamental foliage, and they are changed as becomes requisite, the interest in Greenhouse subjects will be rendered more certain. This is, however, frequently impracticable.

Shape and Aspect. Plenty of light and air being essential conditions for keeping in view in the construction of a Greenhouse, it follows that the site chosen should be an open one. The best shape is a span roof, as light is admitted on all sides, and the plants are not so likely to draw or grow in any one direction. Fig. 148 represents a section of a span-roofed house well adapted for Greenhouse

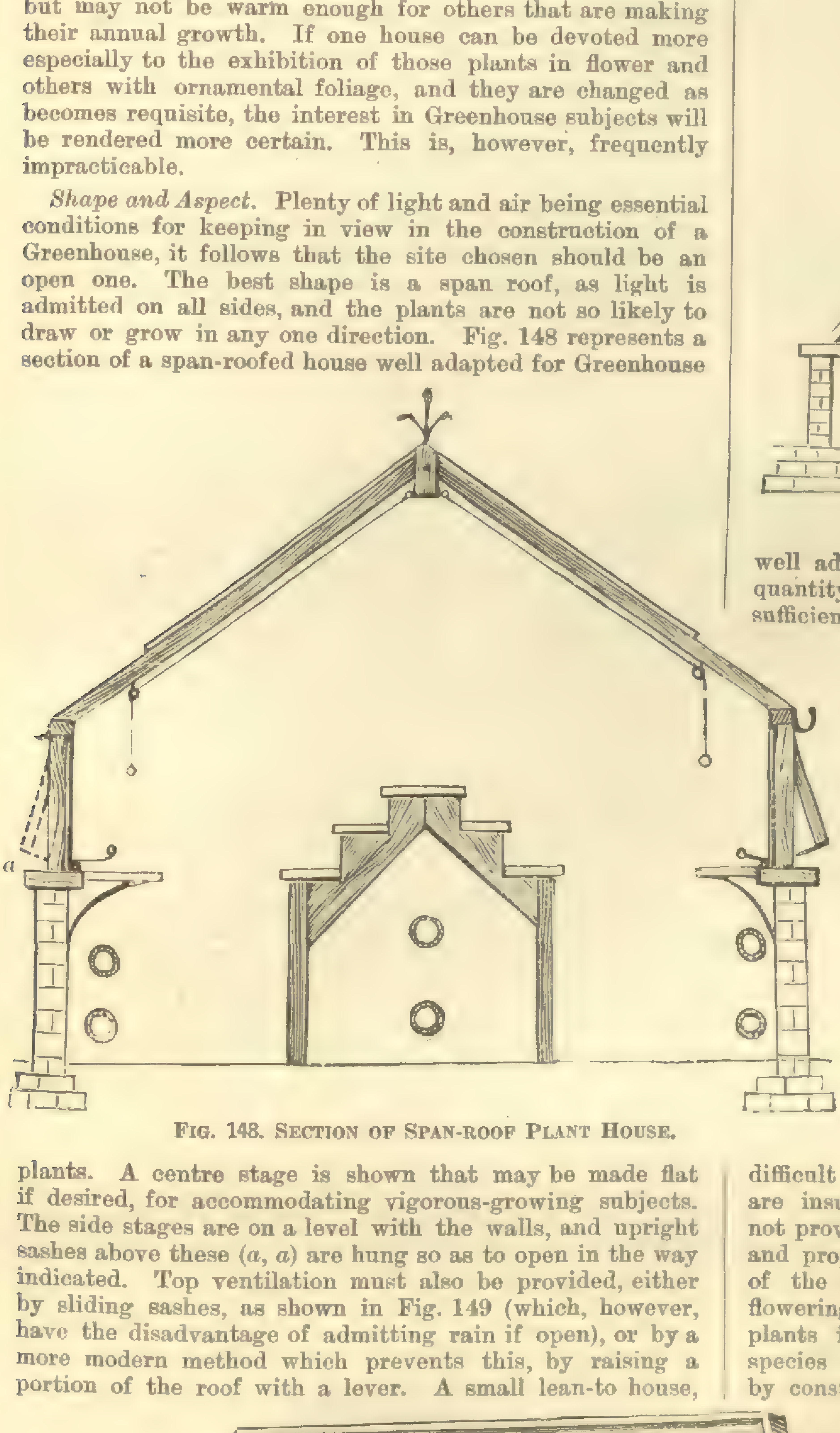


FIG. 148. SECTION OF SPAN-ROOF PLANT HOUSE.

plants. A centre stage is shown that may be made flat if desired, for accommodating vigorous-growing subjects. The side stages are on a level with the walls, and upright sashes above these (*a*, *a*) are hung so as to open in the way indicated. Top ventilation must also be provided, either by sliding sashes, as shown in Fig. 149 (which, however, have the disadvantage of admitting rain if open), or by a more modern method which prevents this, by raising a portion of the roof with a lever. A small lean-to house,

FIG. 149. LEAN-TO HOUSE.

Greenhouse—*continued.*

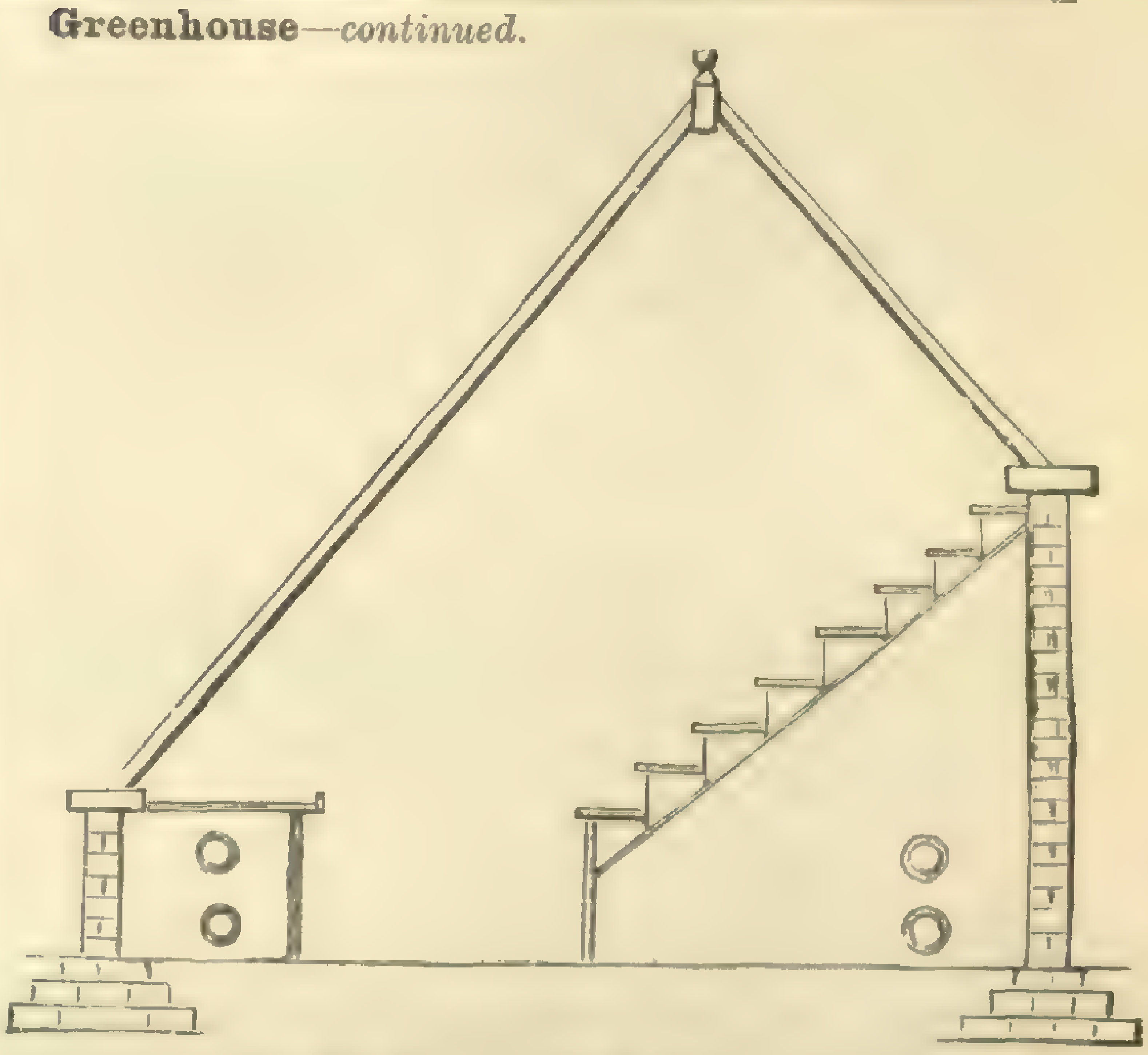


FIG. 150. HIP-ROOFED GREENHOUSE.

well adapted for amateurs or others with only a limited quantity of plants, is shown in Fig. 149. This might be sufficiently heated by a very small hot water apparatus. Hip-roofed houses (see Fig. 150) usually admit light, but are not so convenient for attending and arranging the occupants as the full span. Again, shelf stages are not so favourable to good cultivation as flat ones, where a moist bottom of ashes or small stones may be secured, on which to stand the pots. Ventilation in hip-roofed houses must be obtained by sliding or other movable sashes at the apex, and by small doors inserted in the front wall. The aspect best suited is one nearly south; but, with the full span, the ends should run north and south, so that all possible light may be admitted, and the sun's rays in summer somewhat obstructed in the middle of the day.

Greenhouse plants are divided into two general groups, hard-wooded and soft-wooded.

Hard-wooded Section. This includes all plants of a shrubby habit, and the majority of climbers. A large proportion of them are difficult to cultivate, particularly if their requirements are insufficiently understood, and suitable positions are not provided. The majority flower in spring and summer, and proper treatment varies according to the condition of the plants in such as the growing, resting, and flowering periods. Healthy and floriferous hard-wooded plants in spring, notably the numerous and beautiful species from Australia and the Cape, are only secured by constant attention throughout the preceding summer and winter. Nearly all repotting should be attended to just after the annual growth begins, this season varying with different species. A somewhat closer atmosphere, and more moisture, may be allowed for a month afterwards, to encourage the emission of roots into the new soil. Afterwards, more air may be gradually admitted, and, in bright summer weather, a thin, temporary shading applied. The aim, with hard-wooded plants, should be to encourage summer growth to the fullest extent, and to insure its thorough ripening in autumn. Without this, the results subsequently obtained in the production of flowers will be but secondary compared with what is possible under good cultivation. There are also numerous evergreen shrubs and

Greenhouse—*continued.*

small trees of an ornamental character, well adapted for intermixing in Greenhouses as permanent decorative subjects, and a large proportion may be cultivated in comparatively small pots. When any require larger sizes, they should be shifted in spring or early autumn, and, if possible, kept a little closer for a few days afterwards. Examples of hard-wooded flowering plants are: Acacia, Azalea, Boronia, Camellia, Epacris, Erica, and Pimelia.

Soft-wooded Section. This includes all that have stems and leaves of a more or less sappy growth, and are mostly propagated from cuttings in that state, or from seeds. A large number of florists' flowers are included in this section, and, as many of them are growing throughout the winter months, a position where all possible light is obtainable, should be allotted them. Many soft-wooded subjects are easily cultivated; but they are very sensitive to improper treatment, such as allowing too close an atmosphere, or too much heat or shade. A number of beautiful Greenhouse plants are annually raised from seed, and good strains or selections of such varieties as Calceolarias, Celosias, Cinerarias, Mignonette, Primulas, Rhodanthes, &c., should be secured. These should be sown at different periods, in order to prolong the flowering season. Immunity from insects, and a continued growth without check, are important conditions in the successful cultivation of all. Other plants of a soft-wooded nature, but which become somewhat hard with age, are either propagated each year, or, in some cases, treated as perennials. Examples of these are: Chrysanthemums, Eupatoriums, Fuchsias, Pelargoniums, and Salvias. A selection from each is indispensable for Greenhouse decoration, and all are easily cultivated where space admits. An open and somewhat rich soil is a general requirement, and plenty of air and water in summer, after the plants are become established. Lilies of the Valley, Solomon's Seal, *Deutzia gracilis*, *Dicentra spectabilis*, &c., are amongst the most attractive and useful subjects for forcing.

Greenhouse Bulbous Plants. Amongst these, a great diversity and selection are available for cultivation, and numerous beautiful plants are included. Apart from the value of Dutch bulbs for forcing and spring decoration, nearly all the various species from the Cape succeed under Greenhouse treatment, and are highly ornamental when in flower. The majority may be grown in a sandy soil, and in comparatively small pots. Most Cape bulbs should be encouraged to make their growth in a moderately warm house or pit, and then be allowed a season of rest in a cooler place before flowering. In addition to Hyacinths, Tulips, &c., the following are amongst the best of Greenhouse plants generally termed "bulbous," but some of them are in reality not so: Babianas, Begonias (of the tuberous section), several Crinums, Cyclamens, Freesias, Gladioli, Ixias, Lachenalias, Liliums, Narcissi, Nerines, &c. The foregoing, with many others, are well adapted for pot culture, and well repay for any special attention devoted to them.

Arrangement of Flowering Plants, &c. In Greenhouses retained more for the exhibition of plants than for their cultivation, a method of arrangement should be adopted by which the whole may be rendered attractive, and, at the same time, sufficient space allowed each plant to enable it to be properly seen. In span-roof houses, there are usually side stages, and, if large enough, a central one, or otherwise a bed, nearly level with the floor, forms the centre. The latter position, in either case, should be devoted to the taller-growing plants and evergreen shrubs, interspersed with a few in flower, according to the stock at command. Formal arrangement should specially be avoided, the flowering subjects being evenly dispersed throughout, and, so far as practicable, plenty of plants with green foliage intermixed. Araucarias, Cordylines, Cyperus, Ferns, &c., are especially useful for the purpose. Small groups of dwarf plants are frequently more effective than when the same are distributed as single specimens. The side stages should be about 3ft. above the ground, and, if any of the plants are very dwarf, they should be raised on pots or suspended from the roof.

Climbers and Pillar Plants. These are important and attractive additions to Greenhouse embellishment. Many are, however, rather unusually susceptible to the attacks of insects, and, if the latter are allowed a footing, considerable injury is caused to plants underneath. If taken down from the wires each winter, thoroughly washed, and occasionally examined and sponged afterwards during summer, the majority of climbers may be kept tolerably clean; but, if this is neglected, the plants soon become an eyesore, and fail to succeed. Climbers should be planted out so soon as they are large enough to establish themselves, but good specimens should first be prepared in pots. They have, of necessity, to be placed near the side walls, and, as the hot-water pipes are often there, suitable provision is rarely made for roof-covering plants. If such is the case, they can hardly be expected to grow and flower well. An open compost of sandy peat and loam is best, and any special soil may be placed round particular plants requiring it. Copious supplies of water are necessary in summer, but only a little should be applied during the resting period of winter. One or two wires fixed near each rafter, and the plants limited to covering them separately, is the best arrangement, as exclusion of light from plants underneath must be avoided. Fuchsias are amongst the best of subjects, either for pillars or rafters. Tea and Noisette Roses should always be included, and a light position selected for them. *Bougainvillea glabra*, Cestrums, Kennedyas, Passifloras, Swainsonas, and Tacsonias, amongst many others, may be planted where there is space for them to develop.

Airing and Temperatures. A confined, close atmosphere should always be avoided in a Greenhouse devoted to the general cultivation of plants. Cold draughts and improper airing are equally to be condemned. When proper means of ventilation are provided in span-roofed houses, air may be admitted on the opposite side to that from which the wind blows. In pits, or houses of other shapes, the admission of air is an important matter that can only be practised properly after experience is gained. Young and tender growths are frequently much injured through injudicious airing in spring. During warm summer weather, too much can scarcely be given to plants in flower, but with those making their growth its admission should be carefully regulated. A little ventilation at the apex, especially if the house is closely glazed, is advisable whenever the weather is mild. All Greenhouse shrubs permanently employed, and the majority of spring and summer-flowering subjects, should be allowed to rest during winter, by keeping a rather low temperature and a dry atmosphere. A temperature ranging from 45deg. to 50deg. should be a maximum, and 10deg. less will do no injury. In summer, fire heat should be withheld, and the house kept as cool as possible, for preserving the flowers.

Watering. Although a large proportion of cool-house plants require plenty of water, its application indiscriminately would end in destruction with many others. As a rule, those having the finest roots require the least amount of moisture, and as these are invariably hard-wooded, careful watering becomes one of their special requirements. Rules for watering plants are frequently given, but the knowledge can only be properly obtained by experience. Soft-wooded plants require a much larger amount, as their sappy growths are rarely at rest, and the roots should never be allowed to get too dry.

GREENOVIA. Now included under **Sempervivum** (which *see*).

GREEN ROSECHAFER. *See* **Rosechafer.**

GREENWEED. *See* **Genista tinctoria.**

GREGORIA VITALIANA. A synonym of **Androsace Vitaliana** (which *see*).

GREIGIA (named in honour of Major-General Greig, a promoter of Russian horticulture). ORD. *Bromeliaceæ.* A genus comprising two species of large-growing herbs, producing a fine crown of Pineapple-like spiny leaves. Greigias are usually described as requiring stove heat, but in summer they may be placed outside the rock garden or warm border, in light, perfectly-drained soil. In the stove, they require treatment similar to **Billbergia** (which *see*).

FIG. 150. GREIGIA SPHACELATA.

G. sphacelata (scorched). *fl.* rose-coloured, sessile, overlapping each other, and disposed in dense heads; bracts large, tinged with green. Summer. *l.* numerous, erect, sword-shaped, acuminated, fringed with stiff spines. *h.* 3ft. Chili, 1865. See Fig. 150. (R. G. 1865, 474.) SYN. *Billbergia sphacelata.*

GRENVILLEA. Included under **Pelargonium** (which *see*).

GREVILLEA (named in honour of C. F. Greville, a patron of botany). Including *Anadenia, Lysanthe, Manglesia, Molloya, Strangea, Stylurus.* ORD. *Proteaceæ.* A large genus (more than 160 species have been described) of beautiful greenhouse shrubs or trees, limited, with the exception of seven New Caledonian species, to Australia. Flowers in pairs along the rachis of a short and umbel-like or elongated raceme, rarely reduced to a single pair; racemes either terminal or also axillary, rarely all axillary. Grevilleas thrive with ordinary greenhouse treatment. They should be repotted after the flowering season. For general culture and propagation, *see* **Cytisus.**

G. acanthifolia (Acanthus-leaved).* *fl.* reddish, densely disposed in racemes 3in. or 4in. long; styles (as in the other species) long, filiform, considerably exceeding the perianth in length. June. *l.* rigid, divided nearly to the centre; lower divisions coarsely toothed; very suggestive of Acanthus foliage. *h.* 4ft. 1824. (B. M. 2807.)

Grevillea—*continued.*

G. alpestris (rock). A synonym of *G. alpina.*

G. alpina (alpine).* *fl.* red, yellow; racemes very short, terminal, sessile; pedicels pubescent. May. *l.* rather crowded, sessile or nearly so, oval, oblong-lanceolate or almost linear, obtuse or with a small point, sometimes attaining 1in., hirsute or rarely scabrous only above, silky-villous beneath; margins revolute. *h.* 4ft. A much-branched, erect, spreading, or diffuse shrub. SYN. *G. alpestris.* (B. M. 5007.)

G. arenaria (sand-loving). *fl.*, racemes short, terminal, umbel-like, few-flowered, mostly reflexed. *l.* shortly petiolate, obovate-oblong to narrow-oblong, obtuse, with a very small point; margins recurved, minutely hoary-tomentose, and scarcely veined on the upper side, densely tomentose, and often ferruginous underneath. Branches densely tomentose. *h.* 6ft. An erect shrub. SYN. *Lysanthe cana.* (B. M. 3285.)

G. a. canescens (hoary). This closely resembles the type, with the exception that the perianth is more villous, and the points to the laminæ longer. SYN. *G. canescens.* (B. M. 3185.)

G. aspera linearis (rough, linear). A synonym of *G. fasciculata.*

G. asplenifolia (Asplenium-leaved) *fl.* pink; racemes sessile or shortly pedunculate, terminal, or in the upper axils, secund, 1in. to 2in. long. July. *l.* lanceolate or linear-lanceolate, mucronate-acute, entire, acutely toothed or pinnatifid, with short broad acute lobes, contracted into a short petiole. Branches minutely silky-pubescent when very young. *h.* 12ft. to 15ft. 1806. A tall shrub or small slender tree. SYN. *G. longifolia.*

G. Banksii (Banks').* *fl.* red, in dense terminal racemes. August. *l.* 4in. to 8in. long, deeply pinnatifid; segments broadly-linear, decurrent, whitish. *h.* 15ft. 1868. (B. M. 5870.)

G. blechnifolia (Blechnum-leaved). A synonym of *G. Caleyi.*

G. Caleyi (Caley's). *fl.* red; racemes terminal, or in the upper axils, erect, rather dense, secund, shortly pedunculate, 1½in. to 2in. long. June. *l.* deeply pinnatifid or pinnate, with numerous oblong-linear divaricate segments, obtuse or mucronate, with recurved margins, glabrous above, softly villous beneath. Branches densely villous, with soft spreading ferruginous hairs. *h.* 5ft. to 6ft. 1830. A slender shrub. SYN. *G. blechnifolia.* (B. M. 3133.)

G. canescens (hoary). A synonym of *G. arenaria canescens.*

G. Drummondii (Drummond's). *fl.* white, yellow; racemes umbel-like, sessile, terminal, or on very short axillary tufts. June. *l.* sessile, rather crowded, oblong, lanceolate, or linear, obtuse or mucronate; margins recurved. Stems apparently diffuse or procumbent. Branches tomentose and hirsute with long fine-spreading hairs. 1859.

G. dubia (doubtful). A synonym of *G. sericea.*

G. ericifolia (Heath-leaved). *fl.* bright red in the lower part, upper greenish-yellow; racemes terminal, short, but rather loose, and often shortly pedunculate, quite glabrous. Winter. *l.* sessile, linear or lanceolate, mucronate-acute, with revolute margins. Branches pubescent or tomentose-villous. A low, spreading, or diffuse shrub. (B. M. 6361.)

G. fasciculata (fascicled).* *fl.* bright red, with yellow tips; racemes umbel-like, few-flowered, sessile, axillary or terminal. Spring. *l.* sessile or very shortly petiolate, linear-lanceolate, or lower ones oblong-elliptical, obtuse or with a callous point; margins revolute. A low, prostrate shrub in the typical form, but sometimes attaining 3ft. or 4ft. in height. 1873. SYN. *G. aspera linearis.* (B. M. 6105.)

G. glabrata (smooth). *fl.* white; racemes axillary, the upper ones forming a terminal panicle; rachis slender. May. *l.* broadly cuneate, shortly and broadly three-lobed; lobes acute, with fine pungent points, contracted into a petiole, flat, with prominent primary veins. *h.* 5ft. to 6ft. An erect, quite glabrous shrub. 1838. SYNS. *Anadenia Manglesii* and *Manglesia glabrata.*

G. intricata (entangled). *fl.* white; racemes slender, pedunculate, 1in. to 2in. long, and sometimes branched, terminal or lateral. May. *l.* long and slender, once, twice, or three times ternately divided into linear-subulate, almost terete, rigid, acute segments, singly or doubly grooved, often above 1in. long, on a common petiole. Branches slender, glabrous. *h.* 2ft. to 3ft. 1871. (B. M. 5919.)

G. juniperina (Juniper-like). *fl.* pale yellow and green, more or less tinged with red; racemes short, almost umbellate, sessile, terminal. May. *l.* linear, rigid, sharp-pointed. An erect or spreading bushy shrub. (L. B. C. 1003; B. R. 1089.)

G. j. sulphurea (sulphur-coloured). This plant is, according to Bentham, only a variety of *G. juniperina*, from which it differs in the perianth being without any, or scarcely any, red tint. SYN. *G. sulphurea.* (L. B. C. 1723.) This is one of the hardiest of all

Grevillea—*continued.*

the Grevilleas. It flowers freely in the open air, as a wall plant, in the neighbourhood of London.

G. lavandulacea (Lavender-leaved).* *fl.* rich bright rose, racemosely produced in abundance from the points of all the shoots. Spring. *l.* linear, terminated by a sharp spine. 1850. SYN. *G. rosea.* (L. & P. F. G. ii. 56.)

G. longifolia (long-leaved). A synonym of *G. asplenifolia.*

G. macrostylis (long-styled).* *fl.* crimson and yellow, few, in umbel-like axillary or terminal racemes, more or less secund. April. *l.* on short petioles, cuneate at the base, more or less deeply divided into three broad triangular or lanceolate pungent-pointed lobes, nearly glabrous, and more or less veined above, silvery-silky underneath. *h.* 4ft. to 6ft. 1868. (B. M. 5915.)

G. Preissi (Preiss's). A synonym of *G. Thelemanniana.*

G. pulchella (neat). *fl.* white; racemes dense, usually glabrous, terminal or in the upper axils, on short slender peduncles. *l.* pinnate; segments seven to eleven, cuneate, trifid or three-toothed, distinct, or the upper ones confluent and more entire; lobes triangular or lanceolate, acute or pungent-pointed; margins revolute. *h.* 1ft. to 2ft. A rather slender divaricate shrub or under-shrub. SYN. *Anadenia pulchella.* (B. M. 5979.)

G. punicea (scarlet).* *fl.* bright deep red; racemes very short, rather dense, almost sessile at the ends of the branches, very spreading or recurved. *l.* shortly petiolate, oblong-elliptical or almost oval, obtuse, with a small callous point, glabrous, often shining and obscurely penniveined above and frequently with a prominent marginal or inter-marginal nerve, silvery-silky or ferruginous underneath, the midrib alone prominent; margins recurved. An erect shrub. SYN. *Lysanthe speciosa.* (B. M. 6698; B. R. 1319.)

FIG. 151. GREVILLEA ROBUSTA.

G. robusta (robust).* *fl.* orange; racemes panicled. June. *l.* pinnate, with from eleven to twenty-one pinnatifid pinnæ; segments acute, smooth and veiny above, hoary beneath. *h.* 5ft. [illegible] A very graceful foliage plant, and for general purposes the best and most easily-grown of the genus. See Fig. 151. (B. M. 3184.)

Grevillea—*continued.*

G. rosea (rose). A synonym of *G. lavandulacea.*

G. rosmarinifolia (Rosemary-leaved).* *fl.* red, disposed in terminal clusters. June. *l.* linear. *h.* 4ft. This very handsome shrub proves to be hardy in the more southern counties of England. 1824. (L. B. C. 1479.)

G. sericea (silky).* *fl.* rose-coloured; racemes very dense, rather short, on short terminal peduncles. *l.* shortly petiolate, oblong-lanceolate or almost linear, mucronate, with recurved margins, glabrous or sparingly silky above and more or less distinctly penniveined, closely silky-tomentose underneath, the midrib alone prominent. Branches rather slender, silky-pubescent. An erect, spreading, or diffuse shrub. SYNS. *G. dubia, Lysanthe sericea.* (A. B. R. 100; B. M. 3798; L. B. C. 880.)

G. sulphurea (sulphur). A synonym of *G. juniperina sulphurea.*

G. Thelemanniana (Thelemann's).* *fl.* bright deep red and yellowish at the tip, produced in dense pendulous racemes, 3in. or 4in. long. Spring. *l.* pinnate; divisions linear, bright green. Branches slender, somewhat drooping. *h.* 3ft. to 5ft. 1838. This is one of the most elegant of the genus. SYN. *G. Preissi.* (B. M. 5837.)

G. vestita (clothed). *fl.* purple; racemes axillary, dense, scarcely exceeding the leaves; rachis pubescent or villous. May. *l.* cuneate, broad or narrow, tapering toward the very narrow base, more or less deeply three or rarely five-lobed at the end; lobes broad, mucronate, and often pungent, glabrous above when old and veined, pubescent or villous underneath; margins recurved. *h.* 6ft. to 9ft. An erect, bushy shrub. SYN. *Manglesia vestita.*

GREWIA (named in honour of Nehemiah Grew, M.D., famous for his work on the Anatomy of Vegetables). SYNS. *Chadara, Mallococca.* ORD. *Tiliaceæ.* A genus comprising about sixty species of trees or shrubs, for the most part confined to the hotter regions of the Old World. Flowers yellow or rarely purple, axillary, few, or more numerous and panicled. Drupe fleshy or fibrous, entire, or two to four-lobed. Leaves entire or serrate, three to seven-nerved. Grewias thrive in a mixture of sandy loam and peat. Propagated by cuttings, inserted in sand, under a glass, in heat. The species here described are those best known to cultivation.

G. asiatica (Asiatic). *fl.*, petals yellow, linear-oblong, half the length of the sepals; peduncles two or more. July and August. *l.* obliquely cordate, base five-nerved. *h.* 12ft. East Indies, 1792. A small tree.

G. occidentalis (Western).* *fl.* purple; peduncles solitary, one-flowered. July to September. *l.* roundish-ovate, blunt-toothed, smooth. *h.* 10ft. Cape of Good Hope, 1690. (B. M. 422.)

G. sapida (savoury). *fl.* yellow, ½in. in diameter; sepals oblong; petals entire, half the length of the sepals. *l.* sub-sessile, ovate or orbicular, doubly serrate, pilose above, pubescent beneath. Tropical Himalaya. A decumbent shrub.

GREYIA (named after Sir George Grey, Governor-General of the Cape Colony, where the species was discovered). ORD. *Sapindaceæ.* A monotypic genus. The species is a handsome greenhouse shrub, requiring full exposure to the sun, and a season of rest (during which it must be kept rather dry) after the wood is ripened. It grows best in a sandy loam. Propagated by seeds; or by cuttings, made of half-ripened shoots.

G. Sutherlandi (Sutherland's). *fl.* showy, five-petaled, crowded in long, thick, terminal racemes. March. *l.* alternate, sub-cordate, stalked, inciso-lobate. Stems stoutish, soft, smooth. Natal, 1859. (B. M. 6040.)

GRIAS (from *grao*, to eat; fruit edible). Anchovy Pear. ORD. *Myrtaceæ.* A genus containing two or three species of tall, hardly branched, stove evergreen trees, natives of tropical America. Flowers white, large; petals four, coriaceous. Leaves very long, oblong, entire. The species are of quick growth, and thrive in a compost of rich sandy loam. Propagated by cuttings of ripe wood, in spring.

G. cauliflora (stem-flowering).* *fl.* produced in short peduncles from the old stem, not particularly ornamental, but very sweet-scented. Berry ovate, about the size and shape of an alligator's egg, of a brownish-russet colour. *l.* alternate, lanceolate, spathulate or entire, drooping, glossy green, sometimes upwards of 3ft. long. *h.* 30ft. to 50ft. West Indies, 1768. (B. M. 5622.)

G. zamorensis (Zamoran). *l.* ovate-lanceolate, 1ft. to 2ft. long. Peru, 1879. A very noble and striking ornamental foliage plant, not yet much grown.

GRIFFINIA (named in honour of William Griffin, a patron of botany). ORD. *Amaryllideæ.* A genus comprising seven or eight species of very ornamental cool

Griffinia—*continued.*

stove bulbous plants, all natives of Brazil. Upper segments of the perianth distinctly broader than the others, and directed upwards; two of the remaining three spread out at right angles, and the third directed downwards. Leaves broad, usually stalked, and peculiarly netted.

FIG. 152. GRIFFINIA BLUMENAVIA.

Griffinias thrive in well-drained fibrous loam. After growth is completed, water should be withheld for a time, in order to thoroughly ripen the bulbs. All the species, unless forced, flower in spring and summer.

FIG. 153. GRIFFINIA HYACINTHINA.

Griffinia—*continued.*

G. Blumenavia (Blumenave's). *fl.* white, streaked with pale rose; umbel six to eight-flowered; scape erect, 6in. to 8in. high. *l.* oblong-lanceolate, 4in. to 5in. in length, on slender petioles. Bulb medium-sized. 1866. See Fig. 152. (B. M. 5666.)

G. dryades (mountain-wood).* *fl.* purplish-lilac, whitish towards the centre, about 4in. in diameter; umbel large, loose, ten to thirteen-flowered; scape stout, 1½ft. high. *l.* large, oblong-lanceolate, 1ft. long. Bulb large. 1868. (B. M. 5786.)

G. hyacinthina (hyacinthine-blue).* *fl.*, upper segments blue at the top, white towards the base, about 3in. across; umbel nine to ten-flowered; scape rather longer than the leaves. *l.* stalked, ovate-oblong, 6in. to 8in. long, with a remarkable lattice-like venation. Bulbs ovate, moderate sized. 1815. See Fig. 153. (G. C. 1874, ii. 14.)

G. h. maxima (largest). *fl.* white, tipped with rich blue, nearly 5in. across; umbel close, ten to twelve-flowered. *l.* broadly ovate-oblong.

G. ornata (adorned).* *fl.* delicate bluish-lilac, fading off to nearly white, long-stalked; umbel twenty to twenty-four-flowered, and forming a spreading head of some 8in. or 9in. across; scape 1ft. to 1½ft. high, compressed, with an acute ridge on each side. *l.* elliptic-oblong; margins much recurved. 1876. (B. M. 6367.)

GRINDELIA (named in honour of David H. Grindel, a German botanist, 1766-1836). SYN. *Donia.* ORD. *Compositæ.* A genus containing about twenty species of hardy or nearly hardy, biennial or perennial, shrubby or herbaceous plants, natives of North America and extra-tropical South America. Flower-heads yellow, solitary at the ends of the branches, and from 1in. to 2in. across. Leaves alternate, sessile or semi-amplexicaul, often rigid, dentate, or ciliato-serrate. Grindelias are of easy culture in peat and loam. Propagated by seeds, sown in spring or autumn, in a cool greenhouse or frame; by cuttings; and by divisions.

G. arguta (sharp). *fl.-heads* yellow. July and September. *l.*, lower ones spathulate; upper ones linear-oblong, serrated, one-nerved. Stem simple. *h.* 1ft. Mexico, 1822. Herbaceous, hardy. (B. R. 781, under name of *G. angustifolia.*)

G. glutinosa (glutinous).* *fl.-heads* yellow; involucres viscid. January to December. *l.* ovate-oblong, serrated, evergreen. *h.* 2ft. Peru, 1803. Shrubby, nearly hardy. (B. R. 187.)

G. grandiflora (large-flowered).* *fl.-heads* deep yellow or orange, which, prior to expansion, is covered with the glutinous balsamic secretion occurring in some other species of this genus, large, about 1½in. across. Summer. *l.*, radical ones spathulate; cauline ones sessile, clasping, dentate. Stem branching near the top. *h.* 2½ft. to 3ft. Texas, 1851. Hardy biennial. (B. M. 4628.)

G. inuloides (Inula-like).* *fl.-heads* yellow. June to September. *l.* sessile, oblong-lanceolate, acute, serrated at end, not viscid. *h.* 1½ft. Mexico, 1815. Shrubby, hardy biennial. (B. M. 3737; B. R. 248.)

G. speciosa (showy). *fl.-heads* yellow, nearly 3in. across, covered, to a considerable thickness, with a transparent glutinous varnish. *h.* 2ft. Patagonia, 1852. Shrubby, nearly hardy. (L. & P. F. G. iii. 290.)

G. squarrosa (squarrose). *fl.-heads* yellow; scales of involucre filiform at end, revolute, squarrose. July to September. *l.* oblong, amplexicaul, serrated. *h.* 2ft. North America, 1811. Herbaceous, hardy perennial. (B. M. 1706, under name of *Donia squarrosa.*)

GRISELINIA (named in honour of Franc. Griselini, an Italian botanist, who flourished in the middle of the eighteenth century). ORD. *Cornaceæ.* A genus comprising eight species of trees or shrubs, natives of New Zealand, Chili, and Brazil. Flowers diœcious, in terminal panicles. Leaves alternate, often unequilateral, oblong, sub-quadrate or lanceolate, thick, coriaceous, entire, spinose-dentate or angulate; ribs inconspicuous; veins reticulated. Griselinias thrive in light rich loam, and are propagated by cuttings, or by layers. The species described below are probably the only ones yet in cultivation.

G. littoralis (shore-loving).* *fl.* as in *G. lucida.* *l.* ovate or oblong, less oblique at the base, wedge-shaped or narrowed into the slender rather long petiole; veins very obscure below. *h.* 30ft. New Zealand, 1872.

G. lucida (shining). *fl.* minute; pedicels jointed, very short; panicles axillary, often as long as the leaves, much branched, minutely pubescent, with spreading golden (when dry) hairs. *l.* very obliquely ovate, obovate or oblong, quite entire, obtuse or rounded at the tip, very unequal towards the base, one side much narrower than the other; veins very distinct on the under surface. *h.* 10ft. to 12ft. New Zealand. *G. macrophylla* does not appear to be more than a large-leaved form of this.

GRISLEA (named in honour of Gabriel Grisley, author of a work on the Botany of Portugal, who lived in the seventeenth century). ORD. *Lythrarieæ*. A genus now limited to the one species described below, which is a very pretty stove evergreen shrub. It thrives in a compost of fibry and sandy peat and loam. Propagated by cuttings, obtained in spring from firm young shoots, and inserted in sandy soil, under a bell glass, in heat.

G. secunda (side-flowering). *fl.* pale pink; stamens long, purple. *l.* on short petioles, puberulous on both surfaces. Branchlets glabrous. *h.* 4ft. to 6ft. Venezuela and New Grenada, 1820.

G. tomentosa. *See* **Woodfordia tomentosa.**

GROBYA (named after Lord Grey, of Groby, a munificent patron of horticulture; he died in 1836). ORD. *Orchideæ*. A genus containing two species of stove epiphytal orchids, natives of Brazil. Flowers yellow or greenish, tinged and spotted with purple, in short racemes; petals broader than the sepals, forming a sort of helmet overhanging the lip; lip small, five-lobed at the apex. Leaves grass-like, ribbed at the apex. Pseudo-bulbs ovate. For culture, *see* **Stanhopea.**

G. Amherstiæ (Lady Amherst's).* *fl.* ochre-spotted, in pendulous racemes. September. *l.* linear, acute, striated. Pseudo-bulbs ovate, green, terete. *h.* 6in. 1829. (B. R. 1740.)

G. galeata (helmeted). *fl.* green, purple; petals oblong, obliquely-rhomboid, rounded at top, disposed into a helmet along with the dorsal sepal; lateral sepals deflexed, connate at base; lip tripartite; lateral segments linear, middle one cuneate-truncate, with a toothed disk, warted from shining tubercles. Summer. *l.* like those of *G. Amherstiæ*. *h.* 6in. 1836.

GRONOVIA (named in honour of Dr. John Frederick Gronovius, a learned botanist at Leyden; he was a friend of Linnæus, and died in 1763). ORD. *Loaseæ*. A scandent stove or greenhouse annual herb, somewhat resembling the common Bryony. It succeeds in a rich sandy loam. Propagated by seeds, sown on a hotbed; the seedlings, when large enough, being potted off singly, and trained upon sticks.

G. scandens (climbing). *fl.* yellow, small; calyx with a five-toothed border, funnel-shaped; petals five, inserted in the calyx tube. June and July. *l.* alternate, petiolate, broad-cordate, five-lobed, stringy. Texas to Venezuela, 1731.

GROSSULARIACEÆ. A tribe of *Saxifrageæ*.

GROUND CHERRY. *See* **Cerasus Chamæcerasus.**

GROUND IVY. *See* **Nepeta Glechoma.**

GROUND LAUREL. *See* **Epigæa repens.**

GROUND OR EARTH NUT. *See* **Arachis.**

GROUNDSEL. *See* **Senecio.**

GROUNDSEL-TREE. A common name of **Baccharis halimifolia** (which *see*).

GRUBBER, or GRUBBING AXE. A useful garden implement for uprooting trees, &c., somewhat similar

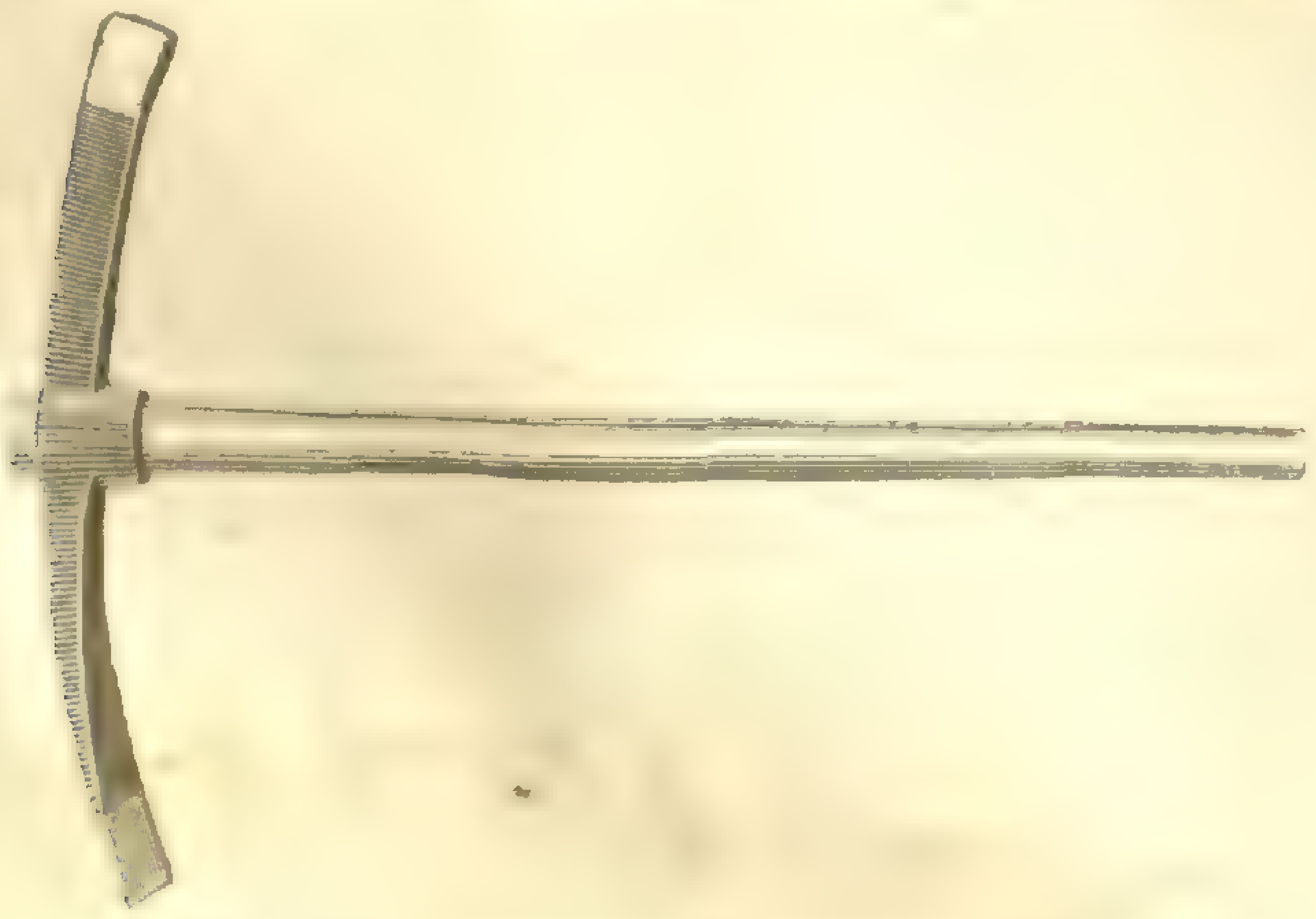


FIG. 154. GRUBBER, OR GRUBBING AXE.

in shape to the ordinary pick, but having both points flattened and made wedge-shaped. One point, for cutting

Grubber, or Grubbing Axe—*continued.*

roots or splitting wood, is in a line with the handle; and the other is placed in a transverse direction for clearing roots of soil (see Fig. 154). What is known as a Daisy

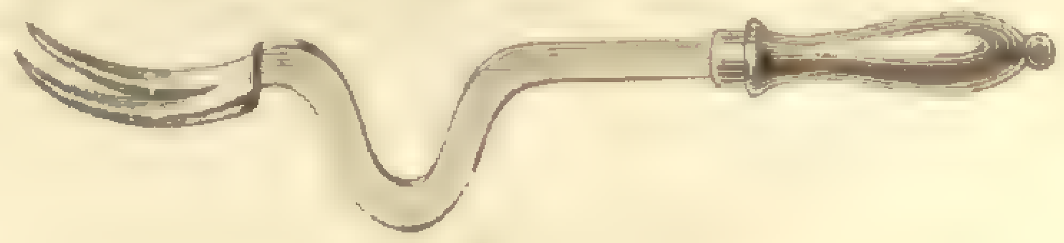


FIG. 155. DAISY GRUBBER.

Grubber (see Fig. 155) is a short implement, made with a claw, for removing the roots of Daisies from lawns. It is furnished with a handle, and the flat portion (*a*) is bent to form a leverage when pressed on the ground.

GRUBS. Apple Grubs may be the larvæ either of a beetle, *Anthonomus pomorum*, or of a small moth, *Carpocapsa pomonana*. The beetle belongs to the group of Weevils, or long-snouted beetles. It is about ⅕in. long, and of a dark colour. In June, the females lay their eggs in the flower buds (one egg in each), and the larvæ soon emerge and live in the interior of the bud, which remains unopened. The grub is footless, of a pale colour, with a dark head. The only remedies are to remove and destroy the buds containing the larvæ and pupæ, and to shake from the branches and destroy the females before they have laid their eggs. *See also* **Apple or Codlin Grub.**

GRYLLOTALPA. *See* **Mole Cricket.**

GRYLLUS. *See* **Crickets.**

GUAIACUM (from *Guaiac*, its South American name). ORD. *Zygophylleæ*. A genus containing about eight species of lofty stove evergreen trees or shrubs, inhabiting the West Indies and sub-tropical North America. Flowers blue or purple; peduncles axillary, one-flowered. Leaves opposite, abruptly pinnate; leaflets entire. Guaiacums require a compost of rich, sandy, fibry loam. Propagated from ripened cuttings, obtained in April, and inserted in sandy soil, under a hand glass, in heat.

G. arborea (tree-like). *fl.* blue, disposed in loose racemes. July. *l.* with seven to fourteen pairs of oval-oblong, blunt leaflets, which are unequal at the base, and are usually alternate. *h.* 40ft. Carthagena, 1816.

G. officinale (officinal).* Lignum Vitæ. *fl.* blue; peduncles twin. July. *l.* with two pairs of obovate or oval blunt leaflets. Bark smooth, variegated with green and white; wood with a peculiar acid aromatic scent. *h.* 30ft. Jamaica, 1694. (B. M. Pl. 41; B. R. 1839, 9.) This species yields the Lignum Vitæ, a greenish-brown, hard, heavy wood, extensively used by turners; and also the fragrant resin commonly called gum guaiacum, which, as well as the bark and wood, is used medicinally.

GUALTHERIA. *See* **Gaultheria.**

GUANO. *See* **Manures.**

GUAREA (from *Guara*, the native name in Cuba). ORD. *Meliaceæ*. A genus comprising thirty species of tall stove evergreen trees or shrubs, natives of tropical America, but rarely seen in cultivation. Flowers white or reddish, in axillary panicles, racemes, or spikes. Leaves pinnate; leaflets opposite or alternate. For culture, *see* **Guaiacum.**

G. grandiflora (large-flowered). *fl.*, petals silky on the outside, hardly ½in. long; racemes elongated. February. *l.*, leaflets many pairs, oval-oblong, 8in. or 9in. long. *h.* 30ft. French Guiana, 1752. All parts of this tree, but especially the bark, have a musk-like perfume.

G. ramiflora (branch-flowered). *fl.* whitish; racemes lateral, very short, rising from the sides of the branches. *l.*, leaflets ovate-lanceolate. *h.* 20ft. Porto Rico, 1822. Tree.

G. Swartzii (Swartz's). *fl.* white; racemes elongated. June and July. *l.*, leaflets lanceolate-ovate, acuminated, feather-nerved, with six or seven prominent lateral nerves beneath. *h.* 20ft. West Indian Islands, 1822. Tree.

GUATTERIA (named in honour of John B. Guatteri, an Italian botanist, once Professor at Parma). ORD. *Anonaceæ*. A genus containing about fifty species of very

Guatteria—*continued.*

ornamental stove evergreen trees or shrubs, all natives of the warmer parts of the New World. Flowers yellowish-white, greenish, or dusky; peduncles one-flowered, axillary or lateral, solitary or fasciculated. Leaves feather-nerved, alternate, entire, exstipulate. Guatterias thrive in a compost of loam, peat, and sand. Propagation is readily effected by cuttings, inserted in sand, under a glass, in heat. Probably *G. Ouregou* is the only species in cultivation.

G. Ouregou (Ouregou). *fl.*, peduncles axillary, short, two to four; calyx segments triangular, pointed; petals rusty-velvety, obovate, interior longer; carpids ovoid. *l.* obovate-oblong, cuspidate, cuneate at the base, shining above, glabrescent beneath; veins prominent. Caribbean Islands. A tall tree. SYN. *Anona chrysopetala.*

GUAVA. *See* **Psidium pyriferum.**

GUAZUMA (name of Mexican origin, employed by Plumier). Bastard Cedar. SYNS. *Bubroma* and *Diuroglossum.* ORD. *Sterculiaceæ.* A genus containing about five species of ornamental stove evergreen trees, natives of the tropical regions of both hemispheres. Flowers small; cymes axillary, shortly pedunculate. Leaves unequally dentate, often oblique. The species thrive in a compost of peat and loam. Cuttings of ripened shoots root freely in sand, under a glass, in heat.

G. ulmifolia (Elm-leaved). *fl.*, petals yellow, with two purple awns at the apex. August. *h.* 40ft. to 60ft. A wide-spreading tree, not unlike the Elm, with leaves that sleep hanging quite down, whilst the petioles remain entirely stiff and straight. West Indies, 1739. SYN. *Bubroma Guazuma.*

GUELDER ROSE. *See* **Viburnum Opulus.**

GUERNSEY LILY. *See* **Nerine sarniensis.**

GUETTARDA (named in honour of John Etienne Guettard, 1715-1786, member of the Academy of Sciences at Paris, who published, in 1747, a catalogue of the plants growing in the vicinity of Estampes). Including *Cadamba* and *Laugeria.* ORD. *Rubiaceæ.* A genus containing about fifty species of ornamental stove evergreen shrubs or small trees, natives chiefly of tropical America. Flowers sessile and unilateral along the branches of the peduncles, and solitary in the forks; corolla salver-shaped, with a cylindrical tube, and from four to nine oval-oblong lobes; peduncles axillary, bifid. Leaves ovate or lanceolate. Guettardas succeed best in peat and loam mixed. Propagated by cuttings, inserted in sand, in heat.

G. odorata (sweet-scented).* *fl.* reddish, nearly 1in. long, villous on the outside, very sweet-scented at night; cymes bifid. Summer. *l.* oval, acute at both ends. *h.* 6ft. to 10ft. Tropical America, 1818. Shrub.

G. rugosa (wrinkled). A synonym of *G. scabra.*

G. scabra (scabrous). *fl.* white; peduncles compressed, villous, almost four times longer than the petioles. *l.* obovate, mucronate, coriaceous, scabrous above, reticulated and pubescent beneath; stipules lanceolate, acuminated, caducous. West Indies, 1818. Tree. SYN. *G. rugosa.*

G. speciosa (showy). *fl.* white, exquisitely fragrant, partaking much of the scent of cloves, large; cymes pedunculate, velvety, much shorter than the leaves. June and July. *l.* broad, ovate or obovate, downy beneath. Branches horizontal, forming a large shady head. *h.* 30ft. Tropical Asia, 1771. Tree. (B. R. 1393.)

GUEVINA (the native name). SYN. *Quadria.* ORD. *Proteaceæ.* A monotypic genus. The species is a greenhouse evergreen tree, succeeding in a peat and loam soil. Propagated by cuttings, inserted in sand, under a glass.

G. Avellana (nut). *fl.* white, hermaphrodite, geminate, pedicellate, disposed in rather long axillary racemes; perianth tube cylindrical; limb ovoid, recurved. June. *fr.* coral-red when ripe, about the size of a cherry. Seed edible, largely used by the Chilians. *l.* alternate, impari-pinnate; leaflets dentate. *h.* 40ft. (in its native country). Chili, 1826. This tree is hardy in the South-west of England.

GUICHENOTIA (named in honour of Antoine Guichenot, a French gardener and traveller). Including *Sarotes.* ORD. *Sterculiaceæ.* A genus containing about half-a-dozen species of greenhouse shrubs, confined to extra-tropical Australia. Flowers nodding, solitary, or

Guichenotia—*continued.*

shortly racemose; calyx five-lobed; petals five, small and scale-like. Leaves narrow, entire, with revolute margins. Guichenotias succeed in a loamy-peat soil. Propagated by cuttings. The two species here described are probably the only ones yet introduced.

G. ledifolia (Ledum-leaved). *fl.* white; racemes several-flowered; calyx scarcely membranous, tomentose, the three prominent ribs on each sepal giving it a rigid, striate appearance. Spring. *l.* on very short petioles, oblong-linear, obtuse, mostly 1in. to 1½in. long; margins much revolute, wrinkled, thick, and soft; stipules similar, but usually rather shorter and more sessile. 1868. SYN. *Lasiopetalum Baueri*, of gardens.

G. macrantha (large-flowered). *fl.* purple, large, pendulous, in racemes of two or three. March. *l.* resembling those of *G. ledifolia.* 1847. (B. M. 4651.)

GUILANDINA. Included under *Cæsalpinia.*

GUILIELMA (named in honour of Queen Frederica Guilielma [Wilhelmine] Carolina of Bavaria). ORD. *Palmæ.* A genus (included, by Bentham and Hooker, under *Bactris*) containing three species of elegant stove palms, confined to the tropical regions of South America. Flower-spike branched. Fruit ovate, about the size of a peach, produced in large pendulous bunches. Leaves pinnate, hairy; leaflets and footstalks spiny. Trunk slender, marked with circular scars, and armed with exceedingly sharp spines. For culture, *see* **Bactris.**

G. speciosa (showy).* *l.* 2ft. to 4ft. long, pinnate; pinnæ about 1ft. long, 1in. wide, apex broader, bifid, deep green nerves on the upper sides clothed with slender black bristles; petioles broadly sheathing at the base, thickly armed with slender long black sharp spines. Stem tall, densely spiny, slender. Amazon. SYN. *Bactris Gasipaës.*

G. utilis (useful). *fl.* monœcious. Seeds edible, having the flavour of chestnuts. *l.*, young ones broad and bifid, bristling with short spines, which spring from the ribs or veins, the ridges of the upper surface and the costa beneath being the parts furnished with them; mature ones forming a handsome pinnate head; petioles densely spiny. Trunk slender, spiny. Costa Rica, 1873. (G. C. 1873, 1271.)

GUINEA PEACH. *See* **Sarcocephalus.**

GUM AMMONIAC. *See* **Dorema Ammoniacum.**

GUM CISTUS. *See* **Cistus ladaniferus.**

GUM ELEMI. The gum-resin of **Amyris Plumieri** (which *see*), &c.

GUMMING. *See* **Gummosis.**

GUMMOSIS, or **GUMMING.** Recent observations on this highly contagious disease have shown that it is caused by a fungus, which has been named by Professor Oudemans *Coryneum Beijerinckii.* The mycelium of this fungus appears to develop a ferment which penetrates the adjacent cells and transforms the cell-walls, the starch granules, and other cell contents into gum, whether these cells belong to the host plant or to the fungus. The ferment of the Coryneum can penetrate into living cells—*e.g.*, those of cambium—and can modify their protoplasm so that the cells that they afterwards produce by division form a tissue with new properties. This tissue is the pathological wood parenchyma. Sooner or later, this tissue begins, in turn, to secrete the ferment, and to change into gum. The quantity of ferment so formed is greater than the amount originally present in the diseased cells. Gumming can be propagated from diseased to healthy places without mycelium extending from one to the other. The action resembles the propagation that albinotic parts exercise on healthy ones. It is conjectured that the channel of propagation is the phloem, and that the contagion is the ferment. In other cases, the mycelium of the Coryneum is the exciting cause of Gumming. A similar disease produces gum arabic, gum tragacanth, and, probably, many resins and gum resins, "One point concerning the spread of this disease seems clear—the fungus itself cannot penetrate the bark: there must be some abrasion or laceration of the latter before the germ tubes can enter. These injuries may clearly

Gummosis, or **Gumming**—*continued.*

arise from many causes; but how do the spores which are undeveloped in the viscid gum gain access to them? That they cannot be blown there by the wind, is obvious. If the Gumming occurs upon the upper branches, of course they may be washed down by the rain; but how do they spread from tree to tree? Obviously, they must be carried —most probably by insects" (Plowright). The best remedy against this disease would, therefore, appear to be the destruction, by burning, of the infested parts, and carefully coating the cut surfaces with some preservative solution. A *résumé* of Dr. Beijerinck's observations and experiments is given in the "Gardeners' Chronicle," n. s., xxii., pp. 239, 410. Fruit-trees affected by Gumming are: Cherries, Peaches, and Plums. Its effects on Peach-trees are most to be dreaded, neither of the others being so much injured as these. In slight cases, the bark should be frequently well washed in damp weather, with a brush and water; but, where the disease pervades the tree to a considerable extent, it is difficult to effect a cure. Gumming occurs most frequently, and is greatly encouraged, where the soil has been too richly manured, and growth is consequently over-luxuriant. The necessity of removing large branches at pruning time should also be specially avoided by judicious summer stopping of the young shoots, in order to divide the sap, and insure an equal medium growth throughout. Lifting and root-pruning, or planting in a poorer soil, might be adopted to check Gumming, where an undue growth is encouraging it.

GUM SENEGAL. *See* **Acacia Senegal.**

GUM-TREE. *See* **Eucalyptus.**

GUNDELIA (named after Andrew Gundelsheimer, a German botanist, who accompanied Tournefort in his journey into the Levant, in 1709). SYN. *Gundelsheimera.*

FIG. 156. GUNDELIA TOURNEFORTII.

Gundelia—*continued.*

ORD. *Compositæ.* A monotypic genus, the species being a hardy, lactescent, thistle-like perennial. It thrives in a sandy-peat soil, and is propagated by division.

G. Tournefortii (Tournefort's). *fl.-heads* purplish, large, in terminal clusters. June to August. *l.* alternate, sessile, pinnatifid; lobes and teeth very spiny. *h.* 1½ft. Eastern Asia, 1739. See Fig. 156.

GUNNERA (named in honour of J. E. Gunner, 1718-1773, a Swedish bishop and botanist). ORD. *Halorageæ.*

FIG. 157. GUNNERA SCABRA.

A genus containing about eleven species of hardy herbaceous perennials, scattered over the Australian, Malayan, New Zealand, Pacific, and South American Islands; also found in South Africa, and in the Andes as far north as the Gulf of Mexico. Flowers greenish, minute, in dense spikes or branched panicles. Leaves all radical, large, petiolate, ovate or cordate-rotundate, simple or lobed, crenate, coriaceous-carnose, often wrinkled. Some of the species form noble plants for sub-tropical gardening, and grow vigorously in a damp, sunny situation, if sheltered from winds. A slight protection, such as a covering of dry leaves, is advisable in severe weather. Propagated by division.

G. manicata (sheathed).* *l.* 12ft. to 20ft. in circumference, borne upon stout footstalks from 4ft. to 6ft. high. 1867. A majestic plant, from the cold and freezing regions, known in Southern Brazil under the name of Campos des Lages. (I. H. 1824, 128.)

G. perpensa (well-considered). *fl.* green. August. *l.* reniform, toothed, shorter than the scape in fruit. *h.* 1½ft. Cape of Good Hope, 1688. (B. M. 2376.)

G. scabra (rough).* *fl.* reddish, small, very numerous, disposed on a large club-shaped spike. *l.* broad, 4ft. to 5ft. in diameter, borne upon stout prickly petioles 3ft. to 6ft. in length. *h.* 4ft. Chili, 1849. A fine plant for large lawns or parks. See Fig. 157. (F. d. S. 1879.)

GUNNERACEÆ. A synonym of *Halorageæ.*

GUNNIA. Included under **Sarcochilus** (which *see*).

GUSTAVIA (named after Gustavus III., King of Sweden, and a patron of Linnæus). SYN. *Pirigara.* ORD. *Myrtaceæ.* A genus consisting of about eleven species of stove evergreen trees or shrubs, natives of tropical America. Flowers showy; peduncles one-

Gustavia—*continued.*

flowered, sub-umbellate. Leaves large, alternate, ovate or spathulate, glossy. Gustavias thrive in a rich loamy soil. Cuttings, made from ripened shoots, root freely if inserted in sand, under a glass, in heat.

G. gracillima (very slender).* *fl.* rose-red, 4in. in diameter, produced from the leaf axils in the young plants, from the wood in old ones, solitary or in pairs; peduncle stout, clavate, 1in. to 2in. long. September. *l.* close-set, spreading and recurved, acuminate, serrate, narrowed into a slender petiole, 1in. to 2in. long; margin somewhat waved; midrib prominent beneath. Trunk slender, quite glabrous. New Grenada, 1845. (B. M. 6151.)

G. insignis (remarkable).* *fl.*, corolla very large, 5in. to 6in. in diameter; petals cream-white, concave, spreading, externally tinged with rose-colour; filaments rose; anthers orange. June. *l.* glossy, dark green, obovate-lanceolate, acuminated at the point, much attenuated at the base, and sessile, or nearly so. *h.* 3ft. to 4ft. Tropical America, 1858. (B. M. 5069.)

G. pterocarpa (wing-fruited).* This is closely allied to *G. insignis*, but differs from it by the ovary being winged, the smaller and white flowers, the comparatively large calycine lobes, and the more coriaceous, nearly entire foliage. (B. M. 5239.)

GUTIERREZIA (meaning probably commemorative). SYNS. *Brachyris* and *Brachyachiris*. ORD. *Compositæ*. A genus comprising about twenty species of erect herbs or sub-shrubs, peculiar to America, extending from the Red River to Mexico; a few also occur in Chili and the extreme South of the continent. Flower-heads yellow, small, very numerous, arranged in corymbs at the ends of the twigs. Leaves linear, entire, gummy. The species are of botanical interest only. The plant grown in gardens under the name of *G. gymnospermoides* is now referred to the genus **Xanthocephalum** (which *see*).

GUTTA-PERCHA-TREE. *See* **Isonandra.**

GUTTIFERÆ. A natural order of trees or shrubs, with a resinous juice, natives of humid and hot places in tropical regions, chiefly in South America or Asia, while a few are found in Africa. Flowers white, yellow, or pink, often incomplete; sepals and petals two to six, rarely eight. Leaves opposite, leathery, entire. The plants are generally acrid, and yield a yellow gum-resin. There are about twenty-four genera and 230 species. Illustrative genera are: *Calophyllum*, *Clusia*, *Garcinia*, and *Mammea*.

GUZMANNIA (named in honour of A. Guzman, a Spanish naturalist). ORD. *Bromeliaceæ*. A genus of four or five species of very handsome stove herbaceous perennials, allied to **Tillandsia** (which *see* for culture). They are all natives of tropical America.

G. Devansayana (Devansay's). *fl.* white, tightly packed within broad, acuminate, scarlet bracts. *l.* dilated at the base, purple-striped. Ecuador. (B. H. 1883, 8, 9.)

G. erythrolepis (red-scaled).* *fl.* white; the uniform purplish-red colour of the bracts distinguishes this at once from *G. tricolor*. *l.* deep green, like those of *G. tricolor*. (F. d. S. 1089.)

G. fragrans (fragrant). A synonym of *Canistrum eburneum*

G. tricolor (three-coloured).* *fl.* pure white; scape erect, 1ft. to 2ft. long, clothed with numerous bracts of a bright pale yellow green, beautifully streaked with blackish-purple towards the top, tipped with red, and at the extreme apex rich scarlet. Summer. *l.* rosulate, broad-linear, sword-shaped, involute, concave, sheathing at the base, 1½ft. long, rich green. 1820. (B. M. 5220.)

GYMNADENIA (from *gymnos*, naked, and *aden*, a gland; the glands of the pollen masses are naked). ORD. *Orchideæ*. Pretty terrestrial orchids, now referred to **Habenaria** (which *see*).

GYMNEMA (from *gymnos*, naked, and *nema*, a filament; the stamineous corona being absent, the filaments are left naked). ORD. *Asclepiadeæ*. A genus comprising about twenty-five species of stove evergreen climbing shrubs or sub-shrubs, natives of Africa, tropical and sub-tropical Asia, and Australia. Flowers yellow, small. Leaves opposite. The plants thrive in a well-drained compost of fibry loam and sandy peat. Cuttings of firm side shoots, made in spring, will root if inserted in sand, in heat.

Gymnema—*continued.*

G. lactiferum (milk-bearing). *fl.* in umbels, shorter than the petioles; throat of small corolla crowned by five fleshy tubercles. July. *l.* on short petioles, ovate, bluntly acuminated, usually unequal-sided. Tropical Asia. The milk of this plant is substituted by the Cingalese for cows' milk.

G. tingens (staining). *fl.* pale yellow, numerous; umbels or corymbs often twin. July. *l.* cordate, acuminated, to oval. Tropical Himalaya, 1823.

GYMNEMA (of Rafinesque). A synonym of **Pluchea** (which *see*).

GYMNOCLADUS (from *gymnos*, naked, and *klados*, a branch; in reference to the naked appearance of the branches during winter). Kentucky Coffee-tree. ORD. *Leguminosæ*. A monotypic genus. The species is a very ornamental hardy deciduous tree. It thrives in a shaded situation, and in a rich, deep, free soil. Propagated by cuttings, made of the roots; or by imported seeds. The name Coffee-tree comes from the fact of its seeds having been used as a substitute for coffee by the early settlers.

G. canadensis (Canadian).* *fl.* white, disposed in terminal simple or thyrsoid racemes. May to July. *l.* bipinnate, with four to seven pairs of pinnæ, the lowest pair bearing single leaflets, the rest bearing six to eight pairs of leaflets. *h.* 30ft. to 60ft. Northern United States, 1748.

GYMNOGRAMME (from *gymnos*, naked, and *gramma*, writing; referring to the spore cases). Including *Ceterach* (in part), *Dictyogramme*, *Grammitis* (in part), *Pterozonium*, *Selliguea*, and *Trismeria*. ORD. *Filices*. A genus consisting of about a hundred species of (except where otherwise stated) beautiful stove Ferns. Sori arising from the veins over the under surface of the frond, linear or linear-oblong, simple or forked. Those species which have the under surface

FIG. 158. FROND OF GYMNOGRAMME CALOMELANOS CHRYSOPHYLLA.

Gymnogramme—*continued.*

of the fronds covered with a yellow powder are popularly known as Gold Ferns, and those with silver powder as Silver Ferns. For culture, &c., *see* **Ferns.**

G. calomelanos (beautiful black). *sti.* tufted, 6in. to 12in. long. *fronds* 1ft. to 3ft. long, 6in. to 12in. broad, tripinnatifid; pinnæ close, lanceolate, lowest largest, about 2in. broad; lower pinnules distinct, often cut down nearly to the rachis; powder white. Tropics, 1790. A variable species. (H. G. F. 30.)

G. c. chrysophylla (golden leaved).* Very like *G. c. peruviana*, but with darker rachis and bright yellow powder. See Fig. 158. Others included in this species by Mr. Baker are: *Brackenridgei*, *intermedia*, *L'Herminieri*, *Martensii*, and *Massoni*.

G. c. peruviana (Peruvian).* *sti.* and rachis castaneous. *fronds* smaller; lower pinnæ deltoid, lower pinnules often cut quite down to the rachis. See Fig. 159.

FIG. 159. GYMNOGRAMME CALOMELANOS PERUVIANA.

G. caudiformis (tail-like). *rhiz.* woody, creeping, scaly. *sti.* 6in. to 9in. long. *fronds* 6in. to 9in. long, ovate-oblong, acuminate; sterile ones 3in. to 4in. broad; others 1in. to 2in. broad. Malay Archipelago, &c., 1862.

G. chærophylla (Chervil-leaved). *sti.* tufted, slender, 3in. to 6in. long. *fronds* 3in. to 6in. long, 2in. to 4in. broad, quadripinnatifid; lower pinnæ and pinnules deltoid; the segments flabellately cut. Cuba to Paraguay, 1825. An elegant annual, producing an abundance of spores.

G. decomposita (decompound).* *sti.* 1ft. long. *fronds* lanceolate-deltoid, 1½ft. long, 1ft. broad, four or five-pinnatifid; pinnæ close, lanceolate, the lowest largest; pinnules close, stalked, deltoid; powder yellow. South America, 1873. See Fig. 160.

G. ferruginea (rusty). *sti.* tufted, 6in. to 12in. long, tomentose. *fronds* about 1ft. long, 3in. to 4in. broad; pinnæ 2in. to 3in. long, ½in. to 1in. broad, cut to the rachis into oblong or linear-oblong entire or slightly toothed lobes; lower surface and rachis densely tomentose. Tropical America. *G. lanata* is a variety with fronds less woolly beneath, and larger pinnules; the lower ones bluntly lobed half way down.

G. flexuosa (wavy). *sti.* 6in. to 18in. long, flexuose, slender. *fronds* 3ft. to 4ft. long, scandent, three to four-pinnate, pinnæ reflexed, outline sub-deltoid; segments flabellately-branched; rachis zigzag, branched. Central America to Peru, 1865.

G. Hamiltoniana (Hamilton's). *rhiz.* wide-creeping, woody. *fronds* dimorphous; barren ones 1ft. long, 3in. to 4in. broad spathulate; fertile ones 4in. to 6in. long, 1½in. broad; stems more than 1ft. long, slender. *sori* in broad continuous rows. Subtropical Himalaya.

G. hispida (hairy). *rhiz.* creeping. *sti.* 3in. to 6in. long, pilose. *fronds* deltoid, tripinnatifid, 2in. to 3in. each way; lower pinnæ much the largest, cut down to the rachis; upper pinnules close, ligulate, blunt; under surface with pale brown tomentum; rachis scaly. New Mexico.

Gymnogramme—*continued.*

FIG. 160. GYMNOGRAMME DECOMPOSITA.

FIG. 161. GYMNOGRAMME JAVANICA.

Gymnogramme—*continued.*

G. japonica (Japanese). *rhiz.* creeping. *sti.* 6in. to 12in. long. *fronds* 1½ft. to 2ft. long, 1ft. broad, pinnate or bipinnate at the base; pinnæ 6in. to 12in. long, 1in. to 2in. broad, linear-oblong, acuminate, entire, lower ones stalked. Japan, &c., 1863. Mr. Baker considers this as "probably not really distinct from *G. javanica*." There is a variegated form.

G. javanica (Javanese).* *rhiz.* creeping. *sti.* 1ft. to 4ft. long. *fronds* 1ft. to 4ft. long, one to two-pinnate; pinnules sessile or nearly so, 3in. to 12in. long, ½in. to 3in. broad, the apex acuminate; rachis stramineous; both surfaces glossy. Tropics of Old World. See Fig. 161.

G. lanceolata (lanceolate). *rhiz.* wide-creeping; scales small. *fronds* simple, 6in. to 12in. long, less than 1in. broad, point acute, edge entire, lower third narrowed gradually to the base. Tropics of Old World.

G. Lathamiæ (Mrs. Latham's).* *cau.* erect. *sti.* chestnut-red, tufted. *fronds* 2ft. to 2½ft. long, quadripinnate; pinnæ ascending, triangular, very shortly stalked, upper surface pale green, lower whitish. Supposed to be a hybrid between *G. decomposita* and *G. schizophylla*. It is a plant of garden origin, recently raised by Mr. W. B. Latham, Curator of the Botanic Gardens, Edgbaston.

G. leptophylla (slender-leaved).* *sti.* 1in. to 4in. long. *fronds* 2in. to 4in. long, 1in. to 1½in. broad, ovate or deltoid, two or three-pinnate; segments cuneate-flabellate, cut into linear or oblong lobes. Temperate regions throughout the world (Jersey). Hardy. One of the very few annual ferns.

G. macrophylla (large-leaved). *rhiz.* creeping, scaly. *sti.* 2in. to 6in. long. *fronds* 1ft. to 1½ft. long, 3in. to 4in. broad, narrowed gradually to both ends. *sori* in single continuous or slightly interrupted rows between the main veins. Malaya.

G. Pearcei (Pearce's).* *sti.* 6in. to 9in. long. *fronds* about 1ft. each way, deltoid, quadripinnatifid; lower pinnæ largest, 4in. to 6in. long; pinnules imbricated; one vein and sorus to each ultimate division; powder white. Peru, 1864.

G. pulchella (neat). *sti.* tufted, 6in. to 9in. long, powdery. *fronds* 6in. to 12in. long, 4in. to 6in. broad, tripinnatifid; lower pinnæ largest; pinnules imbricated; segments flabellate-cuneate; powder pure white. Venezuela. The variety *Wettenhalliana* has pale sulphur-coloured powder.

G. rufa (red). *sti.* tufted, 4in. to 12in. long, hairy. *fronds* 12in. to 18in. long, 3in. to 5in. broad, pinnate; pinnæ distant, stalked, rounded, 1in. to 2½in. long; rachis pilose. Tropical America, 1793.

FIG. 162. GYMNOGRAMME SCHIZOPHYLLA.

G. schizophylla (cut-leaved).* *sti.* tufted, slender. *fronds* 1½ft. to 2ft. long, gracefully arching, very finely cut; ultimate pinnules minute. Jamaica, 1880. See Fig. 162.

G. s. gloriosa (glorious). A garden variety, of more vigorous habit than the type. (I. H. 522.)

G. sulphurea (sulphur-coloured).* *sti.* densely tufted, 1in. to 6in. long, often powdery. *fronds* 6in. to 12in. long, 3in. to 4in. broad, tripinnatifid; lower pinnæ gradually reduced; pinnules flabellately cut; powder bright yellow. West Indies, 1808.

G. tartarea (infernal).* *sti.* tufted, 6in. to 12in. long. *fronds* 1ft. to 2ft. long, 6in. to 12in. broad, oblong-deltoid, bipinnatifid; pinnæ lanceolate, lowest largest; pinnules oblong, obtuse, entire or nearly so; powder dense, pure white. Tropical America, 1817.

Gymnogramme—*continued.*

FIG. 163. GYMNOGRAMME TARTAREA.

See Fig. 163. There are three or four varieties, including *ochracea* (pinnules very regular, and only the lowest toothed; powder bright yellow), *ornithopteris*, and *Steltzneri*.

G. tomentosa (tomentose). *sti.* tufted, 6in. to 12in. long, villose. *fronds* 6in. to 12in. long, deltoid, bipinnate; upper pinnæ simple, stalked, 1in. to 2in. long, ½in. to 1in. broad; lower ones 1in. to 4in. long. South Brazil, &c., 1831.

G. triangularis (triangular).* *sti.* densely tufted, 6in. to 12in. long. *fronds* 3in. to 4in. each way, deltoid; lower pinnæ much the largest, deltoid; others lanceolate, deeply pinnatifid; powder varying from deep orange to white. Vancouver's Island, &c., 1874.

G. trifoliata (trifoliate). *sti.* tufted, 8in. to 12in. long. *fronds* 2ft. to 3ft. long, 6in. to 8in. broad, pinnate; lower pinnæ ternate, upper ones simple, petiolate, 2in. to 4in. long; under surface of fertile fronds clothed with white or yellowish powder. Tropical America, 1810. A variable species.

GYMNOGYNOUS. Having a naked ovary.

GYMNOLOMIA (from *gymnos*, naked, and *loma*, a fringe; in reference to the pappus being much reduced or altogether absent). SYNS. *Gymnopsis* and *Heliomeris*. ORD. *Compositæ*. An interesting genus, containing sixteen species of erect greenhouse or half-hardy herbs, natives, for the most part, of Mexico and Central America. Flower-heads pedunculate, solitary or loosely corymbose. Inferior leaves rarely almost all opposite, superior ones rarely almost all alternate, entire, dentate or lobed. The species described below is the one usually seen in cultivation. For culture, *see* **Helianthus**.

G. multiflora (many-flowered). *fl.-heads* yellow. Autumn. *l.* narrowly linear to lanceolate. *h.* 1ft. to 3ft. New Mexico. Annual. SYN. *Heliomeris multiflora*.

GYMNOPSIS. A synonym of **Gymnolomia** (which *see*).

GYMNOPTERIS. *See* **Acrostichum.**

GYMNOSTACHYS (from *gymnos*, naked, and *stachys*, a spike; in reference to the leafless scapes). ORD. *Aroideæ* (*Araceæ*). A monotypic genus. The species is a pretty greenhouse perennial herb. It thrives in a

Gymnostachys—*continued.*

compost of peat and loam. Propagated by suckers and by divisions.

G. anceps (two-edged). *fl.* white, small, sessile, but not closely packed; perianth segments or scales obovate, truncate, not exceeding the ovary; scapes nearly as tall as the leaves, much flattened, with acute, smooth, or serrulate-scabrous edges. June. *l.*, radical ones erect, rather rigid, strongly nerved, 1ft. to 3ft. long. Roots tuberous, fusiform. Australia, 1820.

GYMNOSTACHYUM (from *gymnos*, naked, and *stachys*, a spike; probably on account of the absence of bracteoles). SYN. *Cryptophragmia.* ORD. *Acanthaceæ.* A genus of about fourteen species of ornamental stove evergreen erect herbs, natives of the East Indies and the Malayan Archipelago. Flowers tubular, in erect spike-like racemes. Leaves cauline or sub-radical, entire or obscurely sinuate. The species here described are those usually seen in cultivation. For culture, *see* **Eranthemum.**

G. ceylanicum (Ceylon).* *fl.* small, pretty, in pseudo-verticils; corolla white, tipped with green and yellow. Winter. *l.* opposite, spreading horizontally, oval or obovate, obtuse, obscurely serrated, having milk-white stains upon a dark green ground. Stem very short, downy. Ceylon. (B. M. 4706.)

G. venusta (charming).* *fl.* purple, remotely fasciculated, subsessile, disposed in slender elongated racemes; panicles large, terminal. September. *l.* ovate-acuminate, crenate. *h.* 6in. Bengal. (B. R. 1380, under name of *Justicia venusta.*)

GYMNOTHRIX. Now referred to **Pennisetum** (which *see*).

GYNANDROPSIS (from *gyne*, a female, *andros*, a male, and *opsis*, appearance; stamens appear as if inserted on the top of the ovary). ORD. *Capparideæ.* A genus containing about ten species of half-hardy or greenhouse annual herbs, natives of tropical regions of both hemispheres. Flowers white or purple, often showy; racemes leafy. Leaves three to seven-foliate. For culture, *see* **Cleome.**

G. coccinea (scarlet). *fl.* scarlet, in a many-flowered corymbose terminal raceme. Summer. *l.* long-stalked, palmipartite. *h.* 6ft. to 9ft. Columbia, 1878. A beautiful cool-house plant.

G. pentaphylla (five-leaved). *fl.* white; petals obovate, four times the length of the calyx; stamens inserted upon the middle of the gynophore. June and July. *l.* quinate; segments obovate-lanceolate or elliptical-lanceolate. Stem unarmed. *h.* 2ft. East and West Indies, 1640. Greenhouse. (B. M. 1681, under name of *Cleome pentaphylla.*)

GYNERIUM (from *gyne*, female, and *erion*, wool; in reference to the stigmas being woolly). Pampas Grass. ORD. *Gramineæ.* A genus of three species of very ornamental hardy, or nearly hardy, herbaceous grasses, natives of tropical and sub-tropical America. They have two-flowered spikelets and diœcious flowers. *G. argenteum* thrives best in a light sandy soil, well enriched with stable manure. The best positions for it are well-prepared shrubbery borders, or sheltered places in the flower garden or pleasure ground, where it will be protected from high winds. It requires plenty of water when making growth. Propagated by seeds, sown under glass, the young plants being grown on in pots until sufficiently large to plant outside. If it is desired to utilise the plumes for indoor decoration, they should be cut from the plants during the latter part of summer.

G. argenteum (silvery).* *fl.* disposed in a very large, dense, terminal, silky panicle, which, including the stalk, attains a height of from 6ft. to 10ft. Autumn. *l.* linear, glaucous-green, about 6ft. long, in large dense tufts, 4ft. to 6ft. high, and as much across; edges very rough. Temperate South America, 1848. See Fig. 164. Varieties have been raised with purplish or yellowish-tinted panicles.

GYNOPHORE. The stalk of the ovary, within the origin of the calyx.

GYNURA (from *gyne*, female, and *oura*, a tail; in reference to the rough, elongated stigma). ORD. *Compositæ.* A genus comprising about twenty species of stove perennial herbs, inhabiting the tropics of the Eastern hemisphere. Flower-heads corymbose or solitary, at the tops of the branches. Leaves alternate, entire, dentate or pinnate, lobed or dissected. Gynuras

Gynura—*continued.*

thrive in a compost of sandy loam and peat, and are propagated by cuttings. The three species described below are those usually seen in cultivation.

G. aurantiaca (orange-coloured).* *fl.-heads* brilliant orange-colour, about ½in. across; florets all tubular. February. *l.* (and stem) furnished over their entire surface with small hairs of a beautiful violet colour; young leaves surrounding the flower-heads especially hairy. *h.* 2ft. to 3ft. Java, 1880. This may be planted in warm places out of doors during the summer. (I. H. 436.)

G. bicolor (two-coloured). *fl.-heads* solitary, terminal; involucres cylindrical; florets rich orange, slightly spreading, uniform, tubular. *l.* on the under side purple, sub-membranaceous, broad-lanceolate or ovate-lanceolate, slightly downy, penninerved, petiolate; petiole short. Stem herbaceous, erect. *h.* 2ft. to 3ft. Moluccas, 1799. (B. M. 5123.)

G. ovalis (oval-leaved). *fl.-heads* yellow. May to September. *l.* thickish, villous; lower ones oval, repand-toothed, stalked; upper sub-lyrate, amplexicaul. *h.* 3ft. East Indies. (B. R. 101, under name of *Cacalia ovalis.*)

FIG. 164. GYNERIUM ARGENTEUM.

GYPSOPHILA (from *gypsos*, lime, and *philein*, or love; in reference to the species preferring a limestone to a chalky soil). ORD. *Caryophylleæ.* A genus containing about fifty species of hardy annual or perennial herbs, inhabiting various parts of Europe and Asia. Flowers white or pink, small, usually disposed in diffuse panicles. Leaves flat or rarely acerose. Some of the species form excellent subjects for growing as border plants or on rockeries. They thrive in a dryish soil, especially if intermixed with calcareous matter or old lime or brick rubbish. Propagated by seeds, by cuttings, or by division. The species described below are perennials.

G. cerastioides (Cerastium-like).* *fl.* white, red-veined, corymbose; petals emarginate. May. *l.* pilose on both surfaces; margins ciliated; radical ones spathulate, on long footstalks, mucronulate; cauline ones obovate. Stems erect, four-sided. *h.* 3½ft. Himalaya. (B. M. 6699.)

G. fastigiata (fastigiate). *fl.* pale red, corymbosely fastigiate; petals very rarely emarginated. July. *l.* linear, rather fleshy, glabrous, flat. *h.* 1ft. Europe, 1801. (F. d. S. 135.)

G. glauca (glaucous). *fl.* white, panicled; panicle divaricating. July. *l.* linear-lanceolate, somewhat fleshy, obtuse. Branches few-flowered, pubescent, clammy. *h.* 1½ft. Caucasus, 1822.

Gypsophila—*continued.*

G. paniculata (panicled).* *fl.* whitish, small, very numerous, panicled; peduncles smooth, filiform, divaricating. June to August. *l.* few, linear-lanceolate, scabrous, acute. *h.* 2ft. to 3ft. Europe, 1759. A very elegant, light, and graceful perennial. (J. F. A. v. 1.)

G. perfoliata (perfoliate). *fl.* pink, panicled; panicles dichotomous, clammy. July. *l.* lanceolate, half stem-clasping, acute, smooth. *h.* 1½ft. to 3ft. South-western Europe, 1817.

G. prostrata (prostrate). A synonym of *G. repens.*

G. repens (creeping). *fl.* white or pale rose-coloured. July to September. *l.* linear, glabrous. Stems somewhat panicled, few-flowered. *h.* 6in. Alps of Europe, 1774. SYN. *G. prostrata.*

G. Stevenii (Steven's).* *fl.* white, panicled; petals broad-linear, obtuse, entire. July. *l.* linear-lanceolate, keeled, grey. Stem diffuse. *h.* 1ft. to 2ft. Caucasus, 1818.

GYRANDRA. *See* **Erythræa.**

GYROCARPEÆ. A sub-order of *Combretaceæ.*

GYROSE. Bent backwards and forwards, like the anthers of cucurbits.

HABENARIA (from *habena*, a thong or strap; spur long, strap-shaped). SYN. *Sieberia.* ORD. *Orchideæ.* A genus of about 400 species of terrestrial stove, greenhouse, or hardy plants with the habit of *Orchis*, many of which are highly ornamental, and well worthy of a place in any garden. They are found in almost all temperate and warm regions. Among the numerous genera which are now included under *Habenaria* are: *Cœloglossum, Gymnadenia, Phyllostachya,* and *Platanthera.* The species described below are hardy, except where stated otherwise, and form very pretty plants for boggy places, or other situations, in moist, peaty soil. For culture of stove species—of which few are now grown—*see* **Bletia.**

FIG. 165. FLOWER OF HABENARIA BIFOLIA CHLORANTHA.

H. bifolia (two-leaved). Butterfly Orchis. *fl.* white, numerous; lip lanceolate, entire, about half the length of the very long, filiform spur. June. Stem angular, 1ft. high. Britain. According to Bentham, this species varies much in the breadth of the leaves as well as of the parts of the flower, and the extreme forms have been distinguished as species, the name of *H. chlorantha* (see Fig. 165) being given to those in which the flowers are large, and the anther cells much more broadly diverging at the base. Darwin, however, regarded *H. chlorantha* and *H. bifolia* as distinct species, and states that they require different species of moths to fertilise them.

H. blephariglottis (fringed-tongued).* *fl.* white, beautifully fringed, in spikes. May and June. North America, 1820. (L. B. C. 925.)

H. candida (white). *fl.* white; spike few-flowered; sepals ovate-acute, nearly equal, dorsal one horizontal; petals undivided, galeate, obtuse; lip entire, ensiform; spur pendulous, twice as long as ovary, two-lobed at apex. August. *h.* 1ft. Sierra Leone, 1844. Stove.

Habenaria—*continued.*

H. ciliaris (ciliated). *fl.* orange-yellow, arranged in dense clusters; lip beautifully fringed. Stems or spikes very showy, 1½ft. to 2ft. high. North America, 1796. An elegant, but rare, species. (B. M. 1668.)

H. cristata (crested).* *fl.* golden-yellow, crowded, individually much smaller than those of *H. ciliaris*; lip deeply fringed. Late spring. Stem 1ft. high. North America, 1806. (L. B. C. 1661.)

H. dilatata (widened). *fl.* white, densely arranged on slender spikes. Summer. Stem 1ft. to 2ft. high. North America, 1823. Very showy and rare.

H. fimbriata (fimbriated).* *fl.* lilac-purple, large, and prettily fringed, arranged on a long spike. Summer. Stem 1ft. to 1½ft. high. North America, 1789. (B. R. 405.)

H. gigantea (gigantic). *fl.* greenish-white, large, about 4in. across, very fragrant; racemes four to six-flowered. July. Stem about 4ft. high. India, 1834. Stove. (B. M. 3374.)

H. Helleborina (Helleborine).* *fl.* green, flesh-colour, sessile, distant, horizontal; lip much larger than the sepals or petals; limb semicircular; column short, broad, concealed under the dorsal sepals and petals. September. *l.* oblong-lanceolate, sub-acute, not plaited, five-nerved, deep green. Sierra Leone, 1870. Stove. SYN. *Eulophia Helleborina.* (B. M. 5875.)

H. Hookerii (Hooker's). *fl.* greenish-white. Spikes slender, twenty to thirty-flowered, 6in. to 12in. high. June. North America, 1822.

H. orbiculata (spherical). *fl.* greenish-white, in loose spikes. *l.* very large, silvery-white beneath, prostrate upon the ground. *h.* 1ft. to 2ft. North America. A distinct and very large species. (L. B. C. 1623.)

H. psycodes (fragrant).* *fl.* varying from rose to crimson, very fragrant, fringed; spikes 4in. to 10in. long. June. North America, 1826. A very showy species, allied to *H. fimbriata*, but with smaller flowers.

H. rhodochila (red-lipped).* *fl.*, scape 9in. long; raceme about twelve-flowered; sepals green, united into a hood-like process; lip large, bright cinnabar-red. August. North China, 1884. Greenhouse.

H. rotundifolia (round-leaved.) *fl.* rosy-purple; lip white, spotted with purple; spikes large and compact. Summer. *h.* 1½ft. to 3ft. North America.

H. salaccensis (Salakian). *fl.*, raceme ovate, 5in. to 6in. long; pedicels short, clothed with two or three narrow-lanceolate bracts; sepals spreading, green; petals reddish, very narrow; lip elongated, tripartite; spur reflexed, narrow, tipped with orange; column short. April. *l.*, lower ones 4in. to 5in. long, lanceolate, acuminate, striated; superior ones becoming gradually smaller, bractiform. Stem 12in. to 14in. high, partially clothed at the base with two or three sheathing scales, leafy upwards. Root a tuber, and three or four thick fleshy fibres. Mount Salak, Java. Stove. (B. M. 5196.)

HABERLEA (named after Karl Konstantin Haberle, Professor of Botany at Pesth, died 1831). ORD. *Gesneraceæ.* A monotypic genus. The species is an elegant little hardy herbaceous perennial, not unlike a miniature Gloxinia, and with a tufted habit. For culture, *see* **Ramondia.**

H. rhodopensis (Mount Rhodope).* *fl.* pale lilac, umbellate, drooping; corolla 1in. in diameter; scapes several, stout, two to five-flowered. April. *l.* all radical, spreading and recurved, obovate-oblong, obtuse. *h.* 4in. to 6in. Roumelia, 1880. (B. M. 6651.)

HABIT. The general appearance of a plant; its manner of growth.

HABITAT. Habitation; native country.

HABLITZIA (named in honour of C. von Hablitz, a distinguished Prussian author and traveller). ORD. *Chenopodiaceæ.* A monotypic genus, the species being a tall, hardy, climbing herb. It thrives in any ordinary garden soil. Increased by divisions, or by seeds.

H. tamnoides (Tamnus-like).* *fl.* green, small, in branching cymes, sessile or terminal, pedicellate. July to October. *l.* alternate, on long petioles, triangularly cordate, acuminate, entire, membranaceous, nerved. Caucasus, 1828.

HABRANTHUS (from *habros*, delicate, and *anthos*, a flower). ORD. *Amaryllideæ.* The plants formerly included in this genus are now referred, by Baker and the authors of the "Genera Plantarum," to **Hippeastrum** and **Zephyranthes** (which *see*).

H. Andersonii. *See* **Zephyranthes Andersonii.**

H. bifidus. *See* **Hippeastrum bifidum.**

H. gracilifolius. *See* **Zephyranthes gracilifolius.**

H. miniatus. *See* **Hippeastrum advenum.**

H. versicolor. *See* **Zephyranthes versicolor.**

HABROTHAMNUS. Included under **Cestrum** (which *see*).

HACKBERRY. A name given to **Celtis occidentalis** (which *see*).

HACQUETIA (named after Balthasar Hacquet, 1740-1815, author of "Plantæ Alpinæ Carniolicæ"). SYNS. *Dondia*, *Dondisia*. ORD. *Umbelliferæ*. A monotypic genus. The species is a pretty little alpine herbaceous perennial, thriving in good stiff loam. It is a slow-growing subject, and should not be disturbed. Propagation must, therefore, only be undertaken in the case of strong healthy clumps, which are best divided before growth commences, in spring.

H. Epipactis (Epipactis).* *fl.* yellow, on short pedicels; scapes one to three, bearing at their tops simple umbels; involucre of five or six obovate leaves, which are longer than the umbels. Spring. *l.* radical, petiolate, palmate, leaflets three, cuneated, two to three-cleft. *h.* 3in. to 6in. Europe, 1823. (L. B. C. 1282.)

HADENA OLERACEA. *See* **Pot-herb Moths.**

HÆCKERIA. *See* **Humea.**

HÆMADICTYON. A synonym of **Prestonia** (which *see*).

HÆMANTHUS (from *haima*, blood, and *anthos*, a flower; referring to the colour of the spathe and filaments of some species). Blood Flower. ORD. *Amaryllideæ*. A genus of about thirty species of fine stove or greenhouse bulbous plants, all—with the exception of about five species from tropical Africa—natives of South Africa. Scape, involucre, umbels, and stamens, all add their quota to the interest and beauty of these curious flowers, which, in some of the species, are gathered together into closely compact umbels, and present in the mass a sort of filamentous appearance, somewhat resembling that of the feathered Hyacinth. The culture of *H. sanguineus*, and its allies of similar habit, is of the simplest nature. The various species blossom at different seasons, and it is important that, after flowering, each should have a period of growth, to be followed by one of rest. A mixture of sandy loam and fibrous peat is most suitable, and the plants flower more freely when under potted. For this reason, it is not necessary to shift them every year. As the bulbs grow, and the strong roots increase, both may be stimulated and supported with weak manure water. Although some of the species of *Hæmanthus* are frequently described as cool greenhouse bulbs, and some even recommend cultivating them in warm borders in the open air, yet they succeed best in a temperature of from 50deg. to 60deg. during the growing season. The sorts with well-developed bulbs should have these quite buried in the soil. When in flower, the blossoms will last longer in cooler quarters. Propagation is effected by offsets, which are produced more or less profusely. They should be removed and potted when the plants are commencing new growth, and be kept in a close pit or house till established. The offsets will reach flowering size all the sooner if kept in a temperature as recommended above for the growing season.

H. abyssinicus (Abyssinian).* *fl.* numerous, in a depressed spherical head, appearing before the leaves; peduncles 1in. to 1½in. long, pale; perianth scarlet, tube ¼in. long; lobes ⅜in. long, slender, with upturned hooded points; filaments scarlet; anthers small, yellow; scape erect, green, 4in. long; spathes 1in. to 1½in. long, pale green and purplish. April. *l.* three to five, autumnal, 4in. to 6in. long, elliptic, green, with purple-spotted sheathing bases. Tropical Africa, 1868. SYN. *H. tenuiflorus coccineus.* (B. M. [illegible].)

H. albo-maculatus (white-spotted). *fl.* in a dense head, 2in. to 3in. in diameter; perianth pure white, 1in. to 1¼in. long; ascending linear segments twice as long as the tube; bracts six to seven, white, veined with green. Scape 3in. to 4in. long; glabrous. December. *l.* two, contemporary with the flowers, ligulate, fleshy, about 1ft. long, 2½in. to 3in. broad, deep green, copiously spotted white. Bulb compressed, 3in. in diameter. *h.* 6in. South Africa, 1877.

H. cinnabarinus (vermilion).* *fl.* red; umbel twenty to forty-flowered; scape slender, about 1ft. long. April. *l.* long, stalked, four in a radical rosette, oblong, 6in. to 8in. long. West Africa, 1855. (B. M. 5314.)

Hæmanthus—continued.

H. deformis (deformed). *fl.* pure white, numerous, shorter than the involucre; head compressed, parallel to the bulb; involucral spathes about six, equal, erect, obovate-oblong, obtuse, ciliate, pure white; perianth tube shorter than the erect, linear, obtuse lobes; stamens exserted; anthers pale yellow; scape very short, sessile amongst the leaves. March. *l.* about two pairs, 3½in. to 4in. long and broad, dark green, smooth, hairy above, pubescent beneath. Bulb 4in. to 5in. in diameter, slightly compressed. *h.* 3in. Natal, 1869. A singular and grotesque species. (B. M. 5903.)

H. hirsutus (hairy). *fl.* pure white, in dense heads, 4in. in diameter; scape compressed, stout, densely hairy. *l.* twin, round-oblong. Transvaal Republic, 1878.

H. incarnatus (flesh-coloured). This species is closely allied to *H. tigrinus*, but is a more elegant plant, with broader leaves; the scape more slender; the divisions of the spathe smaller, narrower, and less coloured; the flowers smaller, and of a different colour. South Africa, 1865. (B. M. 5532.)

H. insignis (remarkable). *fl.* bright orange-scarlet, in an umbel. July. *l.* large, oblong, wavy, and spotted with purple. Stems cylindrical, thickly spotted with purple. Natal. A handsome greenhouse species. (B. M. 4745.)

H. Kalbreyeri (Kalbreyer's).* *fl.* bright crimson; umbel thirty to forty-flowered, 5in. to 6in. in diameter; scape lateral. *l.* oblong. *h.* 6in. Guinea, 1878. (I. H. 354.)

H. Katherinæ (Mrs. Katherine Saunderson's).* *fl.* deep red; umbels dense, 6in. to 7in. in diameter. *l.* oblong, with both veins and veinlets very much more distinct than in the closely allied species *H. multiflorus.* Natal. (B. M. 6778.)

H. Mannii (Mann's). *fl.* crimson-scarlet. Spring. *h.* 1ft. Guinea, 1877. This species closely resembles *H. cinnabarinus* in the flowers, but the leaves are produced from a special stem formed after the scape. (B. M. 6364.)

H. multiflorus (many-flowered). *fl.* deep red; umbels sometimes one hundred flowered, dense, globose, about 6in. in diameter. April. *l.* three to four, oblong, acute, nearly 1ft. long, on a short spotted stem. Sierra Leone, 1783. (B. M. 961 and 1995.)

H. natalensis (Natal).* This species is closely allied to *H. insignis*, but may be distinguished from it by the large, beautifully coloured and dotted, sheathing scales at the base of the plant, by the much longer leaves, by the pale green flowers, the orange-coloured stamens and styles, and by the nearly uniform bracts of the involucre, of a rich ferruginous purple, shorter than the flowers. February. Natal, 1862. A handsome greenhouse plant. (B. M. 5378.)

H. puniceus (scarlet). *fl.* orange-scarlet, with yellow or orange stamens. June. *l.* oblong, elliptical, acute, retuse, wavy. *h.* 1ft. Cape of Good Hope, 1722. (B. M. 1315.)

H. sanguineus (blood-flower). *fl.* scarlet, in dense heads. *l.* two, oblong-elliptic, leathery, glabrous, not spotted. South Africa. This species has decidedly ornamental foliage, and is the one most easily grown. It is a good cool-house plant.

H. tenuiflorus coccineus (scarlet slender-flowered). A synonym of *H. abyssinicus.*

H. tigrinus (tiger-spotted). *fl.* deep crimson, disposed in large heads. April. *l.* linguiform, flat, smooth, fringed at edge, depressed. *h.* 1ft. Cape of Good Hope, 1790. (B. M. 1705.)

H. virescens (greenish). *fl.* whitish. July. *l.* curious, oblong-lanceolate, hairy all over. *h.* 1ft. Cape of Good Hope, 1774. (L. B. C. 702.)

H. v. albiflos (white-flowered). *fl.* white. June. *l.* oblong, strap-shaped, with ciliated margins. *h.* 1ft. Cape of Good Hope, 1791. (B. M. 1239, under name of *H. albiflos.*)

HÆMARIA (from *haima*, blood; in reference to the blood-red colour of the leaves on the under surface). SYN. *Ludisia*. ORD. *Orchideæ*. A genus comprising about four species of terrestrial orchids, natives of China, Cochin China, and the Malayan Archipelago. Flowers racemose, shortly pedicellate or sub-sessile. Leaves shortly petiolate, ovate or elliptic, thickish, membranaceous; bracts membranaceous. *H. discolor*, the only species yet introduced, is an interesting stove plant. For culture, *see* **Goodyera.**

H. discolor (two-coloured). *fl.* white, ¾in. across; spike erect, furnished with a number of crimson bracts. November. *l.* ovate, few, green above, crimson underneath. *h.* 1ft. South China, 1815. (B. R. 271; B. M. 2055, under name of *Goodyera discolor.*)

HÆMATOXYLON (from *haima*, *haimatos*, blood, and *xylon*, wood). Logwood. ORD. *Leguminosæ*. A monotypic genus. The species is a stove evergreen tree, with unarmed branches, or with spines under the leaves. It succeeds in a mixture of sand and peat. Rather firm cuttings of young shoots will root in sandy soil, under glass, and in heat.

Hæmatoxylon—*continued.*

H. campechianum. Campeachy Wood. *fl.* yellow, produced in axillary racemes. *l.* abruptly pinnate, in fascicles; leaflets small, obovate, obcordate. *h.* 20ft. to 40ft. Central America, Columbia, and the West Indies, 1724. This plant yields the well-known logwood of commerce, largely employed by calico-printers, dyers, and hat-makers. It consists of the heart-wood of the tree, from which the sapwood has been removed, and is of a deep, dull, brownish-red colour. (B. M. Pl. 86.)

HÆMODORACEÆ. An order of epigynous monocotyledons, belonging to Lindley's Narcissal alliance of endogens. Perennial herbs, natives of the Cape, North and South America, Central and Eastern Asia, and Southwest Australia. Perianth petaloid, tubular or sub-campanulate, usually hairy or woolly outside, glabrous within. Leaves alternate, usually distichous, sub-ensiform, sheathing at the base, equitant. Bitterness exists in some of the plants. The roots of some also yield a red colour: hence the name of the order. As understood in the "Genera Plantarum," there are twenty-six genera and about 120 species. Well-known genera are: *Anigosanthus*, *Hæmodorum*, and *Wachendorfia*.

HÆMODORUM (from *haima*, blood, and *doron*, a gift; probably in reference to the roots serving as food for the natives of Australia. The name was given by Theophrastes to the Broom-rape). Bloodroot. ORD. *Hæmodoraceæ*. A genus of about seventeen species of pretty greenhouse perennials, all natives of Australia, with black, red, livid green, or orange-coloured flowers. They thrive in peat and loam. Increased by dividing the roots, in spring. The two species described below are those best known to cultivation.

H. planifolium (flat-leaved). *fl.* livid-purple or greenish at the base, in short forked racemes or cymes, collected in a compact, more or less corymbose panicle; perianth segments linear or linear-lanceolate. August. *l.*, lower ones grass-like, flat; upper ones few and short. Stems 2ft. to 3ft. high. 1810. (B. M. 1610.)

H. teretifolium (terete-leaved). This closely resembles *H. planifolium*, but the leaves are from a short sheathing base, very long, slender, and terete, or nearly so. August. 1822.

HAGBERRY. *See* **Cerasus Padus.**

HAIRBELL. *See* **Harebell.**

HAIR GRASS. *See* **Aira.**

HAKEA (named after Baron Hake, a German patron of botany). SYN. *Conchium*. ORD. *Proteaceæ*. A large genus (ninety-five species have been described) of greenhouse evergreen shrubs or rarely small trees, limited to Australia. Flowers hermaphrodite, in pairs; perianth irregular or rarely regular, the tube revolute or curved under the limb, or rarely straight. Leaves alternate, very diversified in shape, flat or terete; margins rarely recurved, and the two surfaces usually similar and equally veined. Hakeas thrive in a compost of two parts peat and one of loam, with sufficient sand to secure perfect drainage. Well-ripened cuttings will root in sandy peat, under a bell glass, if first placed in a cool house, and transferred to a mild bottom heat so soon as a callus is formed. During summer, when the plants are growing, water may be freely given in early morning or evening; at other times, it should be carefully administered.

H. conchifolia (shell-leaved). A synonym of *H. cucullata*.

H. cristata (crested). *fl.* white, small, in short axillary racemes. June. *l.* cuneate-obovate, spinosely toothed, glabrous. *h.* 6ft. to 8ft. 1837.

H. cucullata (hooded).* *fl.* red, small, showy, in dense axillary clusters. June. *l.* leathery, cordate, alternate, sessile, minutely toothed, milky-green. Branches round, very hairy. *h.* 4ft. 1824. SYNS. *H. conchifolia* and *H. Victoriæ*. (B. M. 4528.)

H. Cunninghami (Cunningham's). *fl.*, racemes lateral on the old wood, loosely cylindrical, 3in. to 6in. long. May. *l.* terete, rigid, mostly above 1ft. long. *h.* 12ft. to 16ft. A small tree. SYN. *H. longifolia*.

H. dactyloides (finger-like).* *fl.* white, very small, numerous, in axillary clusters or short racemes; perianth glabrous. July. *l.* from linear-lanceolate to oblong-lanceolate, acute or scarcely obtuse, tapering into a short petiole, rigid, prominently three-nerved. Branches erect. *h.* 7ft. 1790. Shrub. SYN. *Conchium dactyloides*. (B. M. 4528.)

Hakea—*continued.*

H. ferruginea (rusty). *fl.* small, in axillary clusters; perianth glabrous, much revolute; limb ovoid. May. *l.* glabrous or villous, sessile, from cordate-ovate to ovate-lanceolate, shortly acuminate, with a callous point, entire, or with slightly sinuate or undulate margins. Branches tomentose-pubescent. *h.* 3ft. to 4ft. SYN. *H. repanda*. (B. M. 3424; L. B. C. 1750; S. F. A. 45.)

H. florida (flowery). *fl.* white, very small, in axillary clusters. July. *l.* sessile or nearly so, lanceolate or linear-lanceolate, very acute and pungent-pointed, bordered by a few prickly teeth or small lobes. Branches pubescent or villous. *h.* 5ft. to 6ft. 1803. (B. M. 2579.)

H. linearis (linear). *fl.* white, small, in axillary clusters or short racemes; perianth glabrous; tube slender. May. *l.* sessile, linear-lanceolate, pungent-pointed, entire or bordered by a few small prickly teeth. *h.* 4ft. 1824. An erect, bushy, bright green, glabrous shrub. (B. R. 1489; S. F. A. 43.)

H. longifolia (long-leaved). A synonym of *H. Cunninghami*.

H. myrtoides (Myrtle-like). *fl.* red, in axillary clusters. February. *l.* sessile, ovate or sub-orbicular, pungent, marginate, smooth. Branches rather loosely villous, at length glabrous. *h.* 2ft. to 3ft. 1849. (B. M. 4643.)

H. nitida (shining).* *fl.* white, small, numerous, in axillary racemes. June. *l.* obovate-oblong, or rarely lanceolate, sometimes quite entire and obtuse, with a small pungent point, sometimes acute, pungent-pointed, and irregularly bordered by a few prickly teeth or lobes. Branches glabrous. *h.* 6ft. to 8ft. 1803. A dense shrub. (B. M. 2246.)

H. pectinata (comb-like). A synonym of *H. suaveolens*.

H. propinqua (related). *fl.* very small, in little axillary clusters. June. *l.* crowded, terete, smooth, mucronate, rather thick, shortly attenuated at the base. Branches scarcely pubescent. A bushy shrub.

H. pugioniformis (dagger-formed). *fl.* few, in axillary sessile clusters; perianth tube slender. May. *l.* terete, smooth, rigid, with a short pungent point. Branches glabrous or very minutely silky-pubescent. *h.* 2ft. to 4ft. 1796. (L. B. C. 353.)

H. repanda (repand). A synonym of *H. ferruginea*.

H. saligna (Willow-like). *fl.* small, in dense axillary clusters; perianth glabrous. April. *l.* usually lanceolate, obtuse, or with a short, callous point, veinless, or obscurely and obliquely penniveined. *h.* 7ft. 1791. A tall bushy shrub. (S. F. A. 27.)

H. suaveolens (sweet-smelling).* *fl.* white, racemose, smooth. Summer. *l.* furrowed above, pinnatifid, occasionally undivided. *h.* 4ft. 1803. SYN. *H. pectinata*.

H. sulcata (furrowed-leaved). *fl.* small, in dense axillary clusters, the small rachis densely villous. May. *l.* linear-terete, angular, and furrowed, rigid, mucronate, sometimes pungent-pointed. *h.* 5ft. to 6ft. 1820. An erect shrub.

H. s. scoparia (broom-like). *fl.* yellow. May. *l.* mostly longer, sometimes 8in., less pointed than in the type, but occasionally short in some branches. 1849. (B. M. 4644.)

H. Victoriæ (Queen Victoria's). A synonym of *H. cucullata*.

HALESIA (named after Stephen Hales, 1677-1761, author of a famous work on "Vegetable Statics"). Silver-Bell or Snowdrop Tree. SYN. *Pterostyrax*. ORD. *Styracaceæ*. A genus containing about half-a-dozen species of ornamental hardy deciduous small trees, of which three are North American, one Chinese, and two or three from Japan. Flowers white, showy, drooping, on slender pedicels, in fascicles (or rarely very short racemes) from the axils of the fallen leaves of the preceding year. Leaves rather large, ovate-oblong, acuminate, more or less denticulate, slender-petioled. The species are well suited for shrubberies and lawns, in almost any position; but one somewhat sheltered is most suitable, and a deep, sandy, moist soil is best. Increased by layers, or by cuttings of the roots, in spring and autumn.

H. corymbosa (corymbose). *fl.* white, tinted with rose or yellow, in corymbose panicles. June. *l.* rounded at the base, ovate-cuspidate, sharply-serrated, hairy. *h.* 10ft. to 12ft. Japan. SYN. *Pterostyrax corymbosum*. (S. Z. F. J. 47.)

H. diptera (two-winged). *fl.* white. Spring. *fr.* with two large opposite wings and two obsolete ones. *l.* large, ovate, acute, serrated. *h.* 10ft. North America, 1758. SYN. *H. reticulata*. (L. B. C. 1172.)

H. hispida (hairy).* *fl.* white, in corymbose racemes. *fr.* covered with stiff and dense hairs. *l.* large, cordate, on stout petioles. Japan, 1875. SYN. *Pterostyrax hispidum*. See Figs. 166 and 167.

H. parviflora (small-flowered). *fl.* white, drooping; racemes panicled. May. *fr.* clavate, slightly four-winged. *l.* ovate-oblong, acute, nearly entire, downy, glaucous beneath. *h.* 10ft. Georgia and Florida, 1802.

H. reticulata (reticulated). A synonym of *H. diptera*.

Halesia—*continued.*

H. tetraptera (four-winged).* *fl.* pure white, nine or ten in a fascicle, drooping, somewhat resembling those of the Snowdrop. Spring. *fr.* four-winged, 1in. to 2in. long. *l.* ovate-lanceolate, acuminated, sharply serrated. *h.* 15ft. to 20ft. North America, 1756. (B. M. 910; L. B. C. 1173.)

FIG. 166. FLOWERING BRANCH AND DETACHED FLOWERS OF HALESIA HISPIDA.

FIG. 167. PORTION OF FRUITING BRANCH OF HALESIA HISPIDA.

HALIMIUM. Included under *Cistus.*

HALIMODENDRON (from *halimos*, maritime, and *dendron*, a tree; the plant grows in dry, naked, salt-fields, in Siberia). Salt-tree. ORD. *Leguminosæ.* A monotypic genus. The species is a very pretty, silky, hardy deciduous shrub, forming a handsome plant when grafted upon the Laburnum as a standard. It thrives in a sandy soil, and may be increased freely by seeds, by cuttings, or by layers.

Halimodendron—*continued.*

H. argenteum (silvery).* *fl.* purplish, rather large, umbellate, axillary, or fascicled on the old nodes. May to July. *l.* hoary, abruptly pinnate, with two pairs of leaflets. *h.* 4ft. to 6ft. Asiatic Russia, 1779. (B. M. 1016, under name of *Robinia Halimodendron.*)

HALLERIA (named after Albert Haller, 1708-1777, author of "Stirpes Helveticæ," and other botanical works). ORD. *Scrophularineæ.* A genus containing about five species of ornamental greenhouse evergreen glabrous shrubs, of which one is from Abyssinia, another from Madagascar, and the rest from the Cape of Good Hope. Flowers scarlet; cymes terminal, few-flowered; calyx cup-like, bell-shaped, with three to five broad, short lobes; corolla tubular, widening upwards, with an oblique, shortly five-lobed limb. Leaves ovate or oblong. Hallerias thrive in light, rich soil. Propagated by cuttings, which will root freely under a glass. Plenty of water is needed during summer, and a well-ventilated spot is at all times necessary. The species described below is the one usually seen in cultivation.

H. lucida (shining). African Honeysuckle. *fl.* reddish, large, drooping; corolla bilabiate. June. *l.* ovate, acuminate, serrated. *h.* 4ft. to 6ft. Cape of Good Hope, 1752. (B. M. 1744.)

HALLIA (named in honour of Bergen Martin Hall, a pupil of Linnæus). ORD. *Leguminosæ.* A genus containing six species of erect or decumbent greenhouse perennial herbs or sub-shrubs, all natives of South Africa. Flowers purple, small, axillary, solitary. Leaves alternate, simple, very entire, often black-dotted, two-stipuled. The best-known species is *H. imbricata.* For culture, *see* **Alhagi.**

H. imbricata (imbricated). *fl.* purple, axillary, sessile. August. *l.* cordate-ovate, convolute, imbricated. *h.* 1½ft. 1812. (B. M. 1850, 2596.)

HALORAGEÆ. An order of herbs or under-shrubs, rarely annual, aquatic, or terrestrial. Flowers often axillary, solitary, or aggregate, sometimes whorled in a spike, rarely pedicelled, sometimes panicled. Leaves usually opposite or whorled, simple, entire or toothed, the submerged ones usually pectinate, rarely entire; stipules none, or (in *Gunnera*) adnate to the petiole. The species are sparingly dispersed throughout the world, and may be found in damp places, ditches, and small streams, sometimes submerged. There are nine genera and eighty species. Well-known examples are: *Gunnera* and *Hippuris.*

HALTICA CONCINNA and **H. NEMORUM.** *See* **Turnip Fly.**

HAMAMELIDEÆ. A small order of shrubs or small or large trees, inhabiting temperate and sub-tropical Asia, South Africa, and North America. Calyx four-partite, more or less adnate to the ovary; limb truncate or five-lobed; lobes valvate or imbricate. Leaves alternate, petioled, simple, penninerved; stipules deciduous. There are about fifteen genera and thirty species. Examples: *Bucklandia, Corylopsis, Hamamelis,* and *Liquidambar.*

HAMAMELIS (from *hama*, with, and *melon*, fruit; the fruit accompanies the flower). Witch-hazel. ORD. *Hamamelideæ.* A genus containing three species of hardy deciduous shrubs or small trees, one from the United States, the others from Japan. Flowers yellow, two to three bracteolate, glomerate. Leaves alternate, sub-rotundate, unequal at the base, crenate-dentate. *H. virginica*, the species best known in gardens, thrives in a moist sandy soil, and may be propagated by layers. During autumn and winter, the plant is profusely covered with its fine rich yellow flowers, which begin to expand

Hamamelis—*continued.*

before the leaves of the previous summer drop off, and continue on the bush throughout the winter; after the petals drop off, in spring, the persistent calyces remain on till the leaves reappear in April or May.

H. arborea (tree-like).* *fl.*, petals clear rich primrose-yellow; calyces deep claret. Winter. Japan, 1862. This plant differs from the American species in forming a small tree, 15ft. to 20ft. high, and in its larger and finer flowers. (G. C. n. s., i., 187; B. M. 6659, under name of *H. japonica.*)

H. japonica (Japanese). *fl.* lemon-yellow. A form with paler flowers, and of much dwarfer habit than *H. arborea*. *H. Zuccariniana* is an allied form, with pale petals and a greenish-brown calyx.

H. virginica (Virginian).* *fl.* yellow, disposed in axillary clusters. October to February. *l.* obovate, acutely toothed, alternate, on short petioles. North America, 1736. Shrub. The seeds of this plant contain a quantity of oil, and are edible; the bark and leaves are astringent. (B. M. 6684.)

HAMATO-SERRATE. Serratures having a somewhat hooked form.

HAMELIA (named after Henry Louis du Hamel du Monceau, 1700-1782, a celebrated French author). ORD. *Rubiaceæ.* A genus containing six or eight species of handsome, ornamental, free-flowering evergreen stove shrubs, natives of tropical and sub-tropical America. Flowers yellow, reddish or scarlet, in di- or trichotomous cymes, sessile or shortly pedicellate; bracts minute. Leaves opposite or three to four nate, verticillate, petiolate, membranaceous, ovate oblong, and acute at both ends. Hamelias succeed best in a compost of sandy peat and fibrous loam. Nearly ripened cuttings will root during the early part of summer, inserted in sand, under glass, with bottom heat. The two species here described are those usually seen in stoves.

H. patens (spreading). *fl.* almost scarlet; cymes di-trichotomous, disposed in a terminal pedunculate umbel. Summer. *l.* three in a whorl, oval-oblong, pubescent. *h.* 5ft. to 10ft. South America, 1752. (B. M. 2533.)

H. ventricosa (swollen). *fl.* yellow, almost 1in. long, campanulate, ventricose, on long pedicels; racemes terminal. September. *l.* three in a whorl, glabrous, oval-oblong. *h.* 8ft. South America, 1778. (B. M. 1894; B. R. 1195.)

HAMILTONIA (named after William Hamilton, an eminent American botanist). SYN. *Spermadictyon.* ORD. *Rubiaceæ.* A genus comprising three or four species of ornamental stove evergreen shrubs, natives of tropical and sub-tropical India, China, and the Indian Archipelago. Flowers white or blue, fascicled or umbellate; corolla funnel-shaped. Leaves opposite, ovate-lanceolate, shortly petioled. A loam and peat compost is most suited to Hamiltonias. Half-ripened cuttings root freely in sand, under a glass, with a moist bottom heat.

H. scabra (rough). *fl.* azure-blue, deliciously fragrant; inflorescence densely villous. November to March. *l.* ovate-lanceolate, short-acuminated, scabrous on both surfaces. *h.* 4ft. to 6ft. Nepaul, 1823. SYN. *Spermadictyon azureum.* (B. R. 1235.)

H. spectabilis (showy). *fl.* lilac-blue, in large, much-branched panicles, agreeably scented. Winter. *l.* ovate-lanceolate, green and smooth above, paler and rough beneath. *h.* 4ft. to 6ft. (R. H. 1872, 191.)

H. suaveolens (sweet-smelling). *fl.* pure white, sessile, in terminal corymb-formed heads, very fragrant. October. *l.* broad-lanceolate, 3in. to 6in. long. *h.* 4ft. to 6ft. India to China, 1818. (B. R. 348.)

HAMMER, GARDEN. Hammers are principally used in gardening for nailing wall trees. The head should be rather short, and quite flat at the end used for

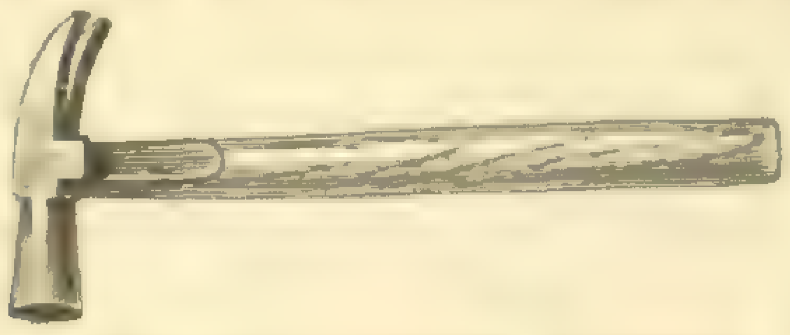


FIG. 168. GARDEN HAMMER.

driving nails. The other end should be shaped like a claw, and turned back sufficiently to serve as a fulcrum for drawing out nails that are useless or misplaced. See Fig. 168.

HAMULOSE. Covered with little hooks.

HANCORNIA (a commemorative name). ORD. *Apocynaceæ.* A monotypic genus. The species is a small, loosely or pendulously branched tree, from Brazil. For culture, *see* **Tabernæmontana.**

H. speciosa (showy). *fl.* sweet-scented, resembling those of Jasmine; cymes terminal, few-flowered, shortly pedunculate. *fr.* yellow, marked with red spots, about the size of a plum, edible. *l.* opposite, small, oblong, sharp at the base, and rounded, but shortly pointed at the apex, penniveined. *h.* 20ft. The tree yields a milky juice, which, when exposed to the air, hardens into a kind of caoutchouc.

HAND BARROW. *See* **Barrow.**

HAND GLASSES. These are very useful as temporary coverings for plants that are too tender for being fully exposed. They are also utilised in propagating various subjects, as the top part may be readily removed and easy access thus secured for attending to whatever is inside. Various shapes are made, the bases being generally square, hexagonal, or octagonal. The first-named is the most con-

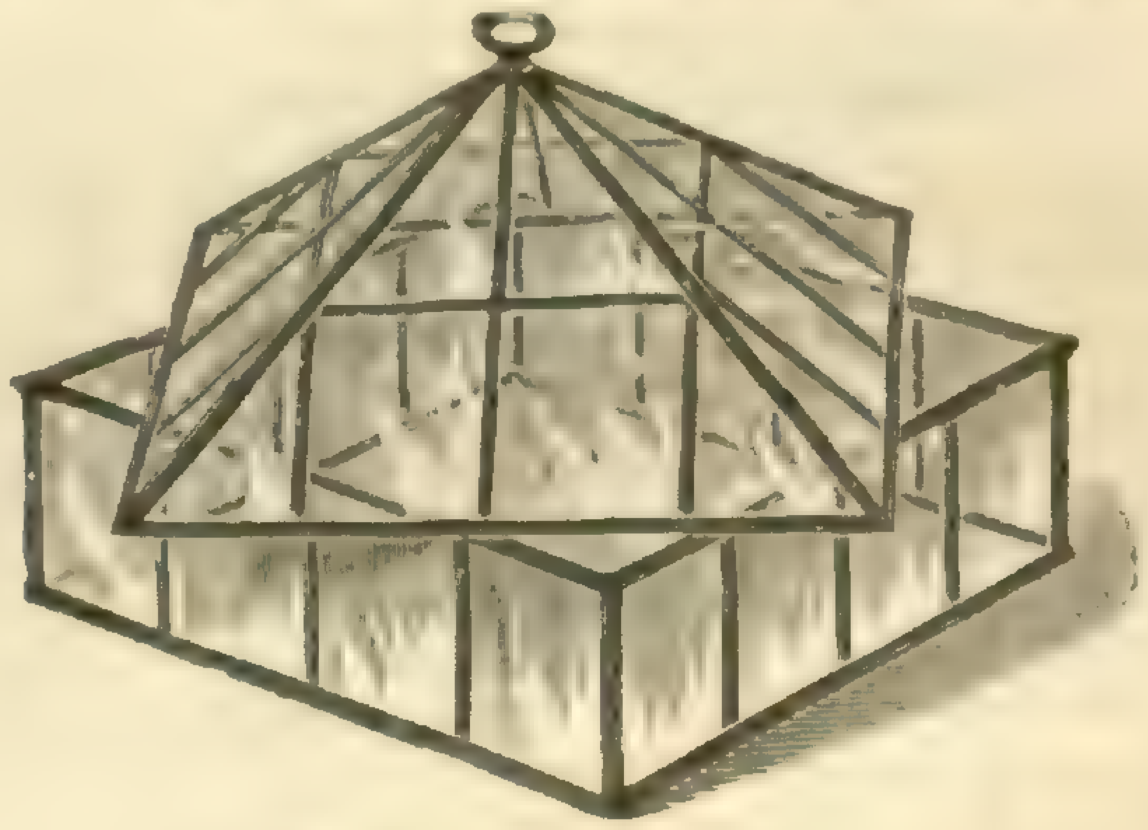


FIG. 169. HAND GLASS.

venient shape (see Fig. 169), and if the framework is constructed with copper or cast iron and kept painted, it lasts a long time, and answers well. Air may be admitted by tilting up the movable top, or the latter may be taken off and replaced at will. Hand Glasses, when employed for propagating purposes, should be glazed airtight, by having the glass fitted into the framework without laps.

HAND-PLANT. *See* **Cheirostemon.**

HAND-WEEDING. The necessity of Hand-weeding is now obviated, in a considerable degree, by the general insertion of seeds in lines, and the occasional passing of the hoe between them. This only misses a few weeds by the sides of plants that may readily be removed when thinning takes place; whereas, under the old system of sowing broadcast, whole seed beds of any description had to be Hand-weeded, to prevent the proper plants from becoming smothered. Hand-weeding gravel walks should be practised after a storm, if there are any weeds about, as they may then be easily pulled up and destroyed.

HANGING. A term applied to plants or cuttings when only partially inserted in holes, previously made by a dibber, the ends not being placed in contact with the earth at the base. It is very important that Hanging should be avoided, especially with cuttings; failure to emit roots, under such conditions, being almost a certainty.

HAPLOPAPPUS (from *haploos*, simple, and *pappos*, down; in reference to the absence of the outer pappus). SYN. *Aplopappus.* ORD. *Compositæ.* A genus containing sixty species of perennial herbs or sub-shrubs, natives of North America, from California to Texas and Mexico, Chili and Patagonia. Flower-heads yellow, large or medium; pappus often reddish, rarely white; achenes glabrous or silky-villous. Leaves alternate, entire, or rigidly ciliate-dentate, rarely pinnatifid. *H. spinulosus*, perhaps the only species yet in cultivation, is a very ornamental sub-shrub, of easy culture in ordinary garden soil. It may be increased by divisions, or by seeds.

Haplopappus—*continued.*

H. spinulosus (spiny). *fl.-heads* bright golden yellow, 1in. or more across. August. *l.* hoary, deeply pinnately cut into linear segments. *h.* 6in. to 18in. Rocky Mountains, 1874. (B. M. 6302.)

HAPLOPHYLLUM. Now included under **Ruta** (which *see*).

HARDENBERGIA (named in honour of the Countess of Hardenberg, sister to Baron Huegel, the celebrated traveller). ORD. *Leguminosæ.* A small genus (three species have been described) of greenhouse, glabrous, twining herbs or under-shrubs, limited to Australia. Flowers violet, white, or pinkish, with a yellowish or greenish spot on the standard; in axillary racemes. Leaves of one, three, or five entire stipelate leaflets. The species succeed in a compost of two parts peat and one loam, with the addition of a little sand and charcoal, to keep the soil open. Propagated by seeds, or by cuttings, made of firm young side shoots in April, inserted under a bell glass, and placed in a warm frame or pit, without bottom heat. Hardenbergias are well adapted for planting out, and training up rafters in a greenhouse, where there is a little shade in summer, and a temperature of 40deg. to 45deg. in winter.

H. Comptoniana (Compton's).* *fl.* closely resembling those of *H. monophylla* in size, colour, and structure; in pairs or clusters of three or four along the racemes. March. *l.*, leaflets three or five, varying from ovate to linear-lanceolate, rather obtuse. rounded or truncate at the base. 1803. SYNS. *H. digitata* (B. R. 1840, t. 60), *H. Huegelii*, *H. Lindleyi*, *H. Makoyana*, *Glycine Comptoniana* (A. B. R. 602; B. R. 298), *Kennedya macrophylla* (B. R. 1862).

H. cordata (heart-shaped). A synonym of *H. monophylla.*

H. digitata (digitate). A synonym of *H. Comptoniana.*

H. Huegelii (Huegel's). A synonym of *H. Comptoniana.*

H. Lindleyi (Lindley's). A synonym of *H. Comptoniana.*

H. Makoyana (Makoy's). A synonym of *H. Comptoniana.*

H. monophylla (one-leaved).* *fl.* purple, usually numerous, in pairs or rarely three together, the upper racemes often forming a terminal panicle. April. *l.*, leaflets always solitary, usually ovate or lanceolate, more or less cordate or rounded at the base, often coriaceous and strongly reticulate, but varying from broadly cordate-ovate to narrow lanceolate. 1790. SYNS. *H. cordata*, *H. ovata*, *Glycine bimaculata* (B. M. 263), *Kennedya cordata* (B. R. 944), *K. longiracemosa* (L. B. C. 1940), *K. monophylla* (B. R. 1336; L. B. C. 758), *K. ovata* (B. M. 2169).

H. ovata (ovate). A synonym of *H. monophylla.*

HARDENING-OFF. This refers to the process of gradually inuring plants to a cooler temperature, after they have been subjected to heat, either for the encouragement of growth, for propagating purposes, or for forcing. It is most largely practised in spring, with bedding and other plants, that are to be cultivated throughout the summer in the open air. To avoid sudden checks to tender foliage or flowers, it is important that Hardening-off should be conducted by gradual steps, in preference to direct changes from high to low temperatures.

HARDWICKIA (named after General Hardwicke, once of the East Indian Company). ORD. *Leguminosæ.* A genus containing three species of stove evergreen trees. Flowers small, racemose; racemes slender, paniculate. Leaves abruptly pinnate, one to three-jugate, coriaceous. Hardwickias thrive in a rich sandy loam. Ripened cuttings will root in sand, in a brisk heat.

H. binata (twin-leaved). *fl.* yellow, in axillary and terminal panicles. *l.* with one pair of leaflets; leaflets opposite, obliquely ovate, semi-cordate. *h.* 100ft. India, 1818. This species yields an excellent timber. (B. F. S. 26.)

H. pinnata (pinnate). *fl.* dirty yellow. *l.*, leaflets alternate, ovate-lanceolate, acuminate, one-nerved in the middle, the ultimate one almost terminal. *h.* 40ft. to 50ft. India 1818. (B. F. S. 255.)

HARDY PLANTS. Although this title may refer to all plants sufficiently hardy to withstand the winters of our variable climate unprotected, it more particularly applies to those which are herbaceous and of various heights, and to others of dwarf dimensions introduced from alpine regions. They may, in either case, be of annual, biennial, or perennial duration. A collection of Hardy Plants should form part of the occupants of every garden. The treatment of many of the most popular and useful is of the easiest description, provided due preparation be made in the first place, and ordinary attention bestowed afterwards in keeping the borders cleaned and the cultivated plants properly tied up, to protect them from rough winds. A large number of species of this class of plants are of botanical interest only; but, apart from these, a numerous selection, unsurpassed in beauty and usefulness when in flower, may be obtained for garden embellishment. Some are well adapted for massing in large or small beds, according to the several habits of plants so employed; the majority, however, most suitable for cultivation in private gardens may be better arranged in mixed borders, reserving the dwarf and more delicate kinds for special culture, if possible, on rockwork. A general display at any particular season is not usually the rule with Hardy Plants of a varied description, if we except that made by Narcissi and numerous other bulbs in spring. The flowering period of a mixed collection extends, with one or another genus, nearly throughout the year; spring and autumn being the seasons when most are represented—their requirements being more fully met by a somewhat cooler temperature and moister atmosphere than those experienced in summer. Various select perennials, grown in quantity, afford an invaluable supply of cut blossoms, especially in early autumn, when there is a scarcity, under glass, of flowers adapted for cutting. Their culture is a matter of great importance for this purpose alone. A large number of Hardy Plants, particularly the bulbous section, flower very early in spring, and these are additionally attractive on that account. We are indebted to the latter, and to a selection of hardy annuals and perennials, for furnishing flower beds in spring, and making them interesting, long before it is possible to plant the summer occupants. Spring gardening deserves considerably more attention than it at present receives; at least, in localities where the climate is favourable, and where there is room in the reserve ground for the preparation of plants. Some few gardens have a space specially set apart for hardy spring flowers, in which the latter are kept all the summer, and invariably succeed much better for not being much disturbed. Hardy bulbs, planted permanently, may be left alone with advantage, in such positions; and annual or perennial plants can be renewed as becomes necessary. A number of plants for spring gardening may be propagated annually from seed, or by division of old plants, in autumn, according to the different habits, or period of duration, belonging to each. Hardy spring-flowering subjects, such as Myosotis, Primroses, Polyanthus, Silenes, and Wallflowers, in variety, should be sown during the middle or latter part of summer, and be prepared, in the open ground, for placing out permanently in autumn. Dwarf perennials secured in quantity for associating with these, are: *Alyssum saxatile*, *Arabis albida* and its variegated variety, Aubrietias, Daisies, and dwarf species of Phlox. All these latter may be divided, and the stock largely increased, if desired, after flowering is over, or, better still, in August, on account of dry, hot weather. In geometrical summer flower gardening, perennials can scarcely be appropriately introduced; but, where bedding is of a mixed description, suitable positions may frequently be found for whole beds or masses of such plants as *Anemone japonica alba*, some of the dwarf species of Aster, Border Carnations, tall-growing Lobelias, Pentstemons, Phloxes, Pyrethrums, &c. These are all attractive in their flowering seasons, and materially reduce the supply of more tender subjects, by filling the space in their stead. The majority of Hardy Plants may be readily raised from seeds, which may be sown in pots, and placed in a frame with a very slight heat, from the month of February throughout the summer; or they may be sown outside,

Hardy Plants—*continued.*

after the middle of March, when germination is tolerably certain. Forwarding in frames sometimes has advantages; but it is important that the young plants thus treated be fully exposed to light, and not allowed to become drawn for want of air. A large proportion of perennials may be more readily propagated by division, and this is best performed early in autumn, or at the commencement of new growth in spring.

Preparation and Planting of Mixed Borders. In the preparation of a border for Hardy Plants, it is important that the soil be deeply trenched, so far as it will allow, the autumn previous to planting. If it is moderately rich and heavy, rather than light and sandy, it will be all the better, as many of the vigorous-growing species require a strong soil. Manure should be added at trenching time, to insure its proper incorporation amongst the soil; and, if the surface is laid rough for the winter, the border will be in good condition for planting early the following spring. Herbaceous subjects, in general, are not well suited for planting alone in a border. Mixed borders should not be less than 10ft. or 12ft. wide, and a greater width allows of a better arrangement being provided for the taller-growing sorts. Evergreen shrubs, planted irregularly according to their height, are advisable for permanently furnishing the border in winter, when the primary plants have died down, and they also afford protection from wind and strong sunshine in summer. The object in planting should be to dispose of the different colours, varieties, heights, &c., of the material at command, so that the whole shall prove equally interesting at all seasons, without a frequent repetition of similar effects in different parts. A knowledge of the habit, height, time of flowering, and other points in connection with the various plants employed, will be requisite on the part of the cultivator, to enable him to fix proper positions for each, so that a gradual rise in the heights is secured, at flowering time, from the front line to the back. This cannot always be secured during the first season, on account of the nature of the soil, and its effect on the growth of different plants; but any that are misplaced may be marked, and the error remedied the following season. Tall Asters, Delphiniums, Helianthus, &c., should be planted near the back; other plants, reaching a height of 2ft. to 3ft., placed about the middle; and dwarf ones, such as Aubrietias, Iberis, Pinks, Saxifrages, &c., near the front margin. Mixed borders may be utilised for the cultivation of an endless variety of plants in summer. Spring bulbs may be inserted at intervals, and allowed to take care of themselves; their positions should be marked by sticks or labels, to avoid injury being caused when the tops cannot be seen. Vacant spaces may be utilised for seeds of annuals, either hardy or tender, and these may be sown where the several heights will correspond, at the latter end of March. The general keeping of the mixed border consists in frequently tying up any tall-growing plants that require it; but only those of an erect-growing habit should be thus treated, the stakes not being allowed to exceed the height of the plants, and inserted so as to be hidden by the foliage as much as possible. In moderately heavy soils, watering will not be much required; but, where the ground is light, almost any quantity may be applied in summer. The usual method of annually digging mixed borders, is not to be recommended, as many plants are surface-rooting, and are, consequently, much injured by the process: a slight forking over, to break the surface, and an addition of some leaf soil or light manure, about March, are beneficial. Sufficient space should be allowed each plant without overcrowding, and any subjects which spread beyond their limits—some of the Asters, for instance—should be considerably reduced each year. If alpines are introduced, they should be kept to the front line, and have stones placed round them, to keep the crowns above the ground line, and special soil added round their roots.

Hardy Plants—*continued.*

A large number of these interesting dwarf plants may be successfully grown in mixed borders, if a little extra attention is bestowed on their cultivation, especially in raising the crowns somewhat, to prevent their damping off.

Hardy Aquatic and Bog Plants. Numerous beautiful Hardy Plants succeed best in a very moist situation, and many require entire submersion in water. Where a pond or lake exists, advantage should be taken for providing some accommodation for them, and planting accordingly; or artificial preparation may be made for a limited quantity. Bog plants should, in most cases, have their crowns kept a little above the surface. They may either be planted out, or grown in pans, and plunged. Hardy aquatics, such as *Aponogeton distachyon*, *Nuphar advena* and *N. lutea*, *Nymphæa alba* and *N. odorata*, with several others, may be planted where there is a considerable space and depth of water. *Calla palustris*, *Iris pseudacorus*, *Lythrum Salicaria*, and *Sagittaria sagittifolia*, are examples of such as succeed near the edge, or in shallow water. Amongst others worthy of culture, and which succeed in moist, boggy situations, are: *Anagallis tenella*, *Caltha palustris* and its double form, Droseras, *Parnassia palustris* and other species, *Primula rosea*, *Sarracenia purpurea*, and *Spiræa palmata.*

HAREBELL. A name given to **Campanula rotundiflora** and **Scilla nutans** (which *see*); also spelt Hairbell.

HARE'S EAR. *See* **Bupleurum.**

HARE'S FOOT. *See* **Ochroma Lagopus.**

HARE'S-FOOT FERN. *See* **Davallia canariensis.**

HARE'S TAIL. *See* **Lagurus ovatus.**

HARICOT. The ripe seeds of *Phaseolus vulgaris* and other species of *Phaseolus.*

HARINA. *See* **Wallichia.**

HARONGA (the native name in Madagascar). ORD. *Hypericineæ.* A monotypic genus. The species is an evergreen stove shrub. It thrives in a compost of sandy loam and peat. Propagated by cuttings, made of young shoots, and inserted in sand, under a glass, in heat.

H. madagascariensis (Madagascar). *fl.* yellow; corymbs terminal, very large and branchy. *l.* elliptic-lanceolate, entire Stem round, branching. *h.* 10ft. Tropical Africa and Madagascar, 1822.

HARPAGOPHYTUM (the English name—Grapple Plant—translated into Greek). SYN. *Uncaria.* ORD. *Pedalineæ.* This genus comprises about four species of procumbent canescent perennial herbs, natives of South Africa and Madagascar. Flowers axillary, solitary, shortly pedicellate; pedicels glandular at base. Leaves opposite or alternate, incised.

H. procumbens (procumbent). *fl.*, corolla tube pale; limb purple. *l.* stalked, five-nerved, palmatifid, with coarsely-incised sinuate lobes. Stems many, prostrate. Cape of Good Hope. A very handsome herb, with large fruit, beset with long branches armed with powerful hooked spines; but probably not in cultivation in this country. SYN. *Uncaria procumbens.*

HARPALIUM. Now included under **Helianthus** (which *see*).

HARRACHIA. *See* **Crossandra.**

HARRISONIA. This genus is now included, by the authors of the "Genera Plantarum," under **Marsdenia** (which *see*).

HARTOGIA (named in honour of J. Hartog, an early Dutch traveller in South Africa and Ceylon). SYN. *Schrebera.* ORD. *Celastrineæ.* A monotypic genus. The species is an ornamental greenhouse evergreen shrub, allied to *Cassine.* It proves hardy in sheltered spots. For culture, *see* **Cassine.**

H. capensis (Cape). *fl.* yellow; pedicels few-flowered, axillary, drooping. June. *l.* opposite, oblong, crenated, smooth, hardy stalked. Cape of Good Hope, 1800. A small tree.

HARTSTONGUE. *See* **Scolopendrium.**

HARTWEGIA (named after Theodor. Hartweg, once a botanical collector for the Horticultural Society). ORD. *Orchideæ.* A genus containing about a couple of species of curious little stove epiphytal orchids, closely allied to *Epidendrum.* For culture, *see* **Odontoglossum.**

H. gemma (twin). *fl.* brilliant amethystine-purple. *l.* thick, semi-terete, channelled, acute, blotched with blackish violet. Central America (?), 1878.

H. purpurea (purple). *fl.* purple; perianth spreading; lateral sepals drawn out at the base, adnate to the lip; lip connate with the column, ovate. August. *h.* 1ft. Mexico and Guatemala, 1837. (Ref. B. 94.)

HASSAGAY OR ASSAGAY TREE. *See* **Curtisia faginea.**

FIG. 170. HASTATE LEAF.

HASTATE. Formed like the head of a halbert. A Hastate Leaf is shown at Fig. 170.

HASTINGIA. A synonym of **Holmskioldia** (which *see*).

HAULM. A term often applied to the stems of such plants as Beans, Peas, Potatoes, &c.

HAUTBOIS, or **HAUTBOY.** *See* **Fragaria elatior.**

HAW. The fruit of the Hawthorn, *Cratægus Oxyacantha.*

HAWKBIT. *See* **Leontodon.**

HAWKSBEARD. *See* **Crepis.**

HAWKWEED. *See* **Hieracium.**

HAWORTHIA (named after A. H. Haworth, a distinguished authority on succulent plants, died 1833). ORD. *Liliaceæ.* A genus of about sixty species of small, curious-looking and very interesting greenhouse succulent Aloe-like plants, all—with the exception of a single species from Angola—natives of Southern Africa. Flowers small; peduncle naked, simple or branched, loosely racemose; bracts small, persistent. Rosette leaves never pedunculate, short, broad, thick, fleshy. For culture, &c., *see* **Aloe.**

H. albicans (whitish). *fl.* about ½in. long; racemes nearly 1ft.; peduncles strong, 1ft., often branched. *l.* about thirty, dense, deltoid-lanceolate, 2½in. to 3in. long, 1in. to 1½in. broad; face slightly concave; back round, distinctly keeled. 1795. (B. M. 1452, under name of *Aloe albicans.*)

H. arachnoides (cobweb-like). *fl.* about ½in. long; raceme loose, about 1ft.; peduncles simple, nearly or quite 1ft. *l.* thirty to forty, oblong-lanceolate, 1½in. to 2in. long, scarcely more than ½in. broad, pale glaucous-green; back round, one or two-keeled. 1727. (B. M. 756, under name of *Aloe arachnoides.*)

H. atrovirens (dark-green). *fl.* about ½in. long; raceme loose, few-flowered; peduncle simple, slender, about 1ft. *l.* thirty to forty, dense, oblong-lanceolate, ½in. long, about half as much broad, dark green; face swollen; margin armed with small teeth. 1823. (B. M. 1361, under name of *Aloe arachnoides pumila.*)

H. attenuata (attenuated). *fl.* ½in. long; raceme loose, 6in.; peduncles less than 1ft., simple or branched. *l.* thirty to forty, deltoid-lanceolate, acuminate, 2½in. to 3in. long; face flat, back swollen. Previous to 1790. (B. M. 1345, under name of *Aloe Radula.*)

H. cymbiformis (boat-formed). *fl.* ½in. long; raceme loose, 6in. long; peduncles simple, under 1ft. *l.* twenty to twenty-five, obovate, acute, 1in. to 1½in. long, ¾in. broad, pale green; face slightly concave; back keeled upwards. 1795. (B. M. 802.)

H. fasciata (banded). *fl.* ½in. long; raceme loose, 6in. long; peduncles nearly 1ft., simple or branched. *l.* forty to sixty, dense, ascending, deltoid-lanceolate, 1½in. long, ½in. wide; face glaucous-green, spotted; back swollen. 1816.

H. margaritifera (pearl-bearing). *fl.* ½in. long; raceme 6in. long; peduncles 1ft. or more in length, branched. *l.* thirty to forty, dense, ascending, lanceolate-deltoid, 2in. to 3in. long, about 1in. broad at base; face swollen; back round, keeled above; both

Haworthia—*continued.*

sides endowed with irregular series of large pearly tubercles. 1739. SYN. *Aloe margaritifera.*

H. m. granata (grained) is a smaller-growing form, with somewhat different tubercles. (B. M. 1360, under name of *Aloe margaritifera minima.*)

H. Reinwardtii (Reinwardt's). *fl.* about ½in. long; raceme loose, few-flowered, 6in. long; peduncles simple, 6in. long. *l.* ascending, ovate-lanceolate, 1in. to 1½in. long, ½in. broad; face swollen, shining; back round; apex obscurely keeled. 1820.

H. retusa (retuse). *fl.* ¾in. long; raceme loose, 6in.; peduncles simple, less than 1ft. long. *l.* ten to fifteen, patent, oblong, acute, 1in. to 1½in. long, ¾in. broad; face swollen, bright green; apex cuspidate. 1720. (B. M. 455, under name of *Aloe retusa.*)

H. rigida (rigid). *fl.* about ½in. long; raceme loose, 6in.; peduncle 6in. to 12in., simple or branched. *l.* ovate-lanceolate, brownish-red, 1in. to 1½in. long, about ½in. broad; face concave; back round, with minute tubercles. 1795. (L. B. C. 1430, under name of *Aloe expansa.*)

H. tortuosa (twisted). *fl.* slightly over ½in. long; raceme loose, sub-secund, 6in. to 9in. long; peduncle simple or forked. *l.* spirally arranged, ovate-lanceolate, all ascending, 1½in. to 2in. long, ¾in. broad, dark green; face hollowed out; back swollen; apex subpungent. 1794. (B. M. 1337, under name of *Aloe rigida.*)

H. viscosa (clammy). *fl.* ¾in. long; raceme loose, 6in. to 9in. long, few-flowered; peduncles simple, slender, 6in. long. *l.* ascending, imbricate, ovate, acute, dark green, 1in. to 1½in. long, ½in. broad; face profoundly hollowed out; back swollen. 1727. (B. M. 814, under name of *Aloe viscosa.*)

HAWTHORN. *See* **Cratægus Oxyacantha.**

HAWTHORN CATERPILLARS. The Hawthorn, or Whitethorn, is attacked by the Caterpillars of numerous species of insects, considerably over 100 having been recorded as feeding on it; but, among these, only a few do sufficient damage to require a detailed account of their ravages. They belong to various groups of insects, and most of them are hurtful to several other plants; hence, in this place, references will be given to other headings for some of the insects named. Several belong to the *Lepidoptera*, or butterflies and moths; others to the *Tenthredinidæ*, or sawflies. The more injurious *Lepidoptera* are as follows: *Aporia Cratægi* (Black-veined White Butterfly), an insect not unlike a large Cabbage White Butterfly, but with the wing-veins black, and the wings almost semi-transparent and unspotted. The caterpillars, while young, live together in a web spun over the leaves and branches; but, when full-grown, they separate and live singly. They are then bluish-grey, with black head, legs, anal lobes, and spiracles, and three bands on the back, alternating with two yellow-brown bands. The pupæ are fixed to the branches. These insects, in some parts of England, are common enough to do harm. *Liparis chrysorrhea* (Brown-tail Moth) and *L. auriflua* (Gold-tail Moth) are thick-bodied moths, about 1½in. in spread of wing, white, with a coloured tuft of hair in the tail; and in *L. auriflua* there are dark spots on the front wings. The eggs are laid on the branches, and are covered with the coloured hairs of the tuft. The larvæ live in slender webs among the leaves; they are hairy, with tufts of coloured hairs on tubercles on certain segments. *L. auriflua*, in particular, is often common and destructive (*see* **Liparis**). Looper Caterpillars (*see* **Hybernia** and **Winter Moth**). *Hyponomeuta padella* (Small Ermine Moth), and one or two other species of the same genus, though small moths, are often so numerous as to do great injury to trees and shrubs. Fig. 171 will sufficiently indicate the appearance of the insect, and of the web spun by the larvæ for protection. The varieties of moths in the genus are much alike, their front wings being white or grey, with numerous small black dots; the lower wings are darker, and uniform. *H. padella* is scarcely 1in. in breadth of wings; the others are slightly larger. The females deposit their eggs on branches, in autumn, covering them with a gummy substance, to protect them. The larvæ emerge in spring, and, for a time, feed between the surfaces of the leaves. Afterwards, they eat the epiderm also; and subsequently spin a web in common around new leaves, on which they then feed in safety.

Hawthorn Caterpillars—*continued.*

They are smooth, have a row of dark spots on the sides, and the head is brown. The nests are often extremely conspicuous. The Sawflies that do most harm to Hawthorn are: *Dineura stilata, Eriocampa limacina* (*E. adumbrata*), and *Lyda punctata.* The larvæ of *Lyda* want prolegs, and feed in a web, spun over the branches. Each larva also makes a special silken case for itself (*see* **Lyda**). The larvæ of *E. limacina* eat away the upper surface of the leaves, often stripping it entirely off; and the leaves, in consequence, become marked with brown, scorched spots, or, maybe, completely killed. Frequently, great injury is done by these attacks. The larvæ usually feed in groups of three or four. They resemble small greenish-yellow slugs, covered with a slimy secretion, and are commonly known as "Slug-

FIG. 171. SMALL ERMINE MOTH AND WEB OF CATERPILLARS.

worm." Several cultivated trees are subject to their attacks. *Dineura stilata* is very similar to the last species in the mode in which the larvæ feed; but the latter are uniformly green, have the legs quite visible while on the leaves, and they emit a disagreeable smell. Further information will be given under **Sawflies** (which *see*). The best means of prevention, or of cure, in respect to these insects are as follows: Larvæ living socially in webs are easily removed and destroyed with the webs. The larvæ on the exposed leaves are readily killed by dressing the plants with the powder of Hellebore in water, or by using Paris Green. The foliage of Hawthorn is frequently mined by the larvæ of various small insects, chiefly moths, but the plants do not suffer much real injury in this way.

HAZEL. *See* **Corylus Avellana.**

HAZEL, WITCH. *See* **Hamamelis.**

HEADING, or HEARTING. A term applied to various members of the Cabbage tribe, when their central leaves cease to unfold and commence forming what is usually known as the heart. The closeness of the latter is regulated by exposure to light. Summer is favourable to Heading, even when the plants are in a young state, and winter time against it.

HEADING-DOWN. This applies to the severe pruning of trees and shrubs that have become overgrown. In some cases, it is practised for the encouragement of a better and cleaner growth when signs of declining vigour are apparent. Heading-down will be requisite with fruit-trees which it is intended to graft by any of the methods usually employed, except inarching.

HEARTSEASE. *See* **Viola tricolor.**

HEARTWOOD. The central part of the timber of exogens, hardened or altered by age.

HEATH. *See* **Erica.**

HEATHER. *See* **Calluna vulgaris.**

HEATH, ST. DABEOC'S. *See* **Dabœcia polifolia.**

HEATH, SEA. *See* **Frankenia.**

HEATHWORTS. A name given by Lindley to the order *Ericaceæ.*

HEATING. This, in connection with horticultural structures, is an absolute necessity for securing and regulating temperatures artificially, to suit the requirements of exotic plants; and for the production of flowers, fruits, and vegetables out of their natural season. Its effects may be derived from fermenting material placed inside the structure, or from causes which arise as the product of combustion by fire in the immediate vicinity, transmitted, by means of water or air, to wherever it is desired. These sources of heat, either used separately or in combination, afford the requisite temperatures for different plants, according as their admission is regulated to the various houses in which the latter are grown. Fermenting material evolves a considerable amount of heat, but by a slower process than combustion, as usually understood. A more genial and moist temperature may be secured from the former than from fire heat, but it cannot be so readily regulated. A fermenting mixture of litter and leaves greatly encourages the growth of young plants in spring, and is also preferable for starting early Vines and fruit-trees. It is advisable, in case of severe weather, to make provision for adding fire heat as well. Gentle hotbeds are also very useful for forcing vegetables, and for the raising of seeds generally. Heating by hot air is not adapted for horticultural purposes, on account of the consequent drying of the atmosphere being very injurious to plant life. Flues are but little better; still, means may be adopted for moistening the heated air transmitted by them, where it is impracticable with a continued influx of dry air. Both of these systems may, therefore, be dismissed in reference to all glass houses of modern construction, and one of the various methods of Heating by hot water should be, in all cases, adopted. Before proceeding to notice some of the most approved boilers for requirements on a large or small scale, it may be well to refer to the principles applied to Heating, as on these being properly understood and carried out in the construction of any hot-water apparatus, success or failure in its action materially depends. Heat always has a tendency to equalise itself, by communicating part of its properties to surrounding substances until they are raised to an equal temperature, so far as the original intensity admits. If

Heating—*continued.*

generated by the combustion of fuel inside a boiler, heat may be conveyed, by water or air, to a considerable distance; the more remote it is, the less will be the amount that reaches the further extremity. Heated air or water becomes lighter than when cold, and naturally ascends in consequence. Either may be conducted in an upward incline, or in a perpendicular or horizontal direction, but not readily downwards, on account of the disposition of all heated substances to ascend. This transmission of heat in pipes containing water is usually termed circulation, and the arrangement of the pipes throughout, to allow an unimpeded circulation, is one of the main principles of Heating, but is not sufficiently recognised in many instances. The boiler must be placed below the level of any point the heat from it is intended to reach, the upper, or flow pipe, being connected on the top. The return pipe, by which the cold water enters, should be rendered free from the action of the fire by connecting it near the base—at the front preferably—and on both sides, if this is convenient. Dips in the pipes at any point should be specially avoided, as they frequently impede free circulation—generally more so when extra heat is applied. Houses erected for various purposes may have their quantity of pipes in proportion to the heat required, and still be in connection with the same mains conducting heat to others having much higher temperatures. There are no special rules applicable, in all cases, as to how many pipes a certain house will require, so much depending on stoking, and upon the amount of heat that may be available. It is best to provide for emergencies, in the first place, by insuring a sufficiency of piping, and inserting valves in the flow and return pipes, for regulating the admission of heat. In the arrangement of a Heating apparatus, an important part should be taken by the gardener in charge, as, although the workmen employed may understand the principles on which the success of their work depends, they do not similarly understand the requirements of plants. A proper system must be adopted where there are several houses to be heated and kept at different temperatures, by one or more boilers set and connected together. Main flow and return pipes should be fixed, with a gradual rise, at a point below all others in connection, and near the central part of the distance the heat is intended to reach, so that branches may be taken on either side. All houses or pits intended for Heating separately, and irrespective of the one adjoining, should be provided with check valves near the junction with the main pipes. As heat always rises most rapidly to the highest points, it should be arranged that these are in the houses required at the highest temperatures. Pipes 4in. in diameter are those most largely used for top heat; others, only 3in., are well adapted for beds or for small houses. In houses specially devoted to plants requiring a somewhat dry atmosphere in winter — Pelargoniums, for instance—an extra 2in. pipe is sometimes fixed along the lower part of the rafters for drying the air, this being generally attended with excellent results in the production of large, clean flowers, free from damp.

Boilers. Of these, there are numerous forms in use. Some are composed of one or two series of cast-iron pipes placed in an upright or horizontal direction, and exposed to the action of the fire. Others are made of welded or wrought iron, and as they can be purchased in such a variety of sizes, and invariably answer well, their use is somewhat extensive. The more simple a boiler is in construction, and the greater surface it exposes to the direct action of fire used, the better. Tubular boilers frequently become choked with fuel amongst the pipes or tubes, and, if this is not prevented, a great loss of heat is sustained. Boilers having complicated arrangements of any sort are seldom so effective as those of a simple form, the divisions between the parts in the furnace soon becoming choked with soot. The requisite size of boiler depends on its approximate Heating power, the length of pipes connected, and the amount of heat required. It is advisable to make provision, in the first place, by fixing a Heating power considerably higher than that absolutely necessary. A great deal depends on the sort of fuel used, the rapidity of draught, and the manner of stoking. The plain Saddle Boiler is well known as being one of the oldest types, but, when properly set, still amongst the most efficient. There are various modifications of it, which claim various advantages, such as economising fuel, heat, &c. One of the most useful and efficient forms is the Flue and

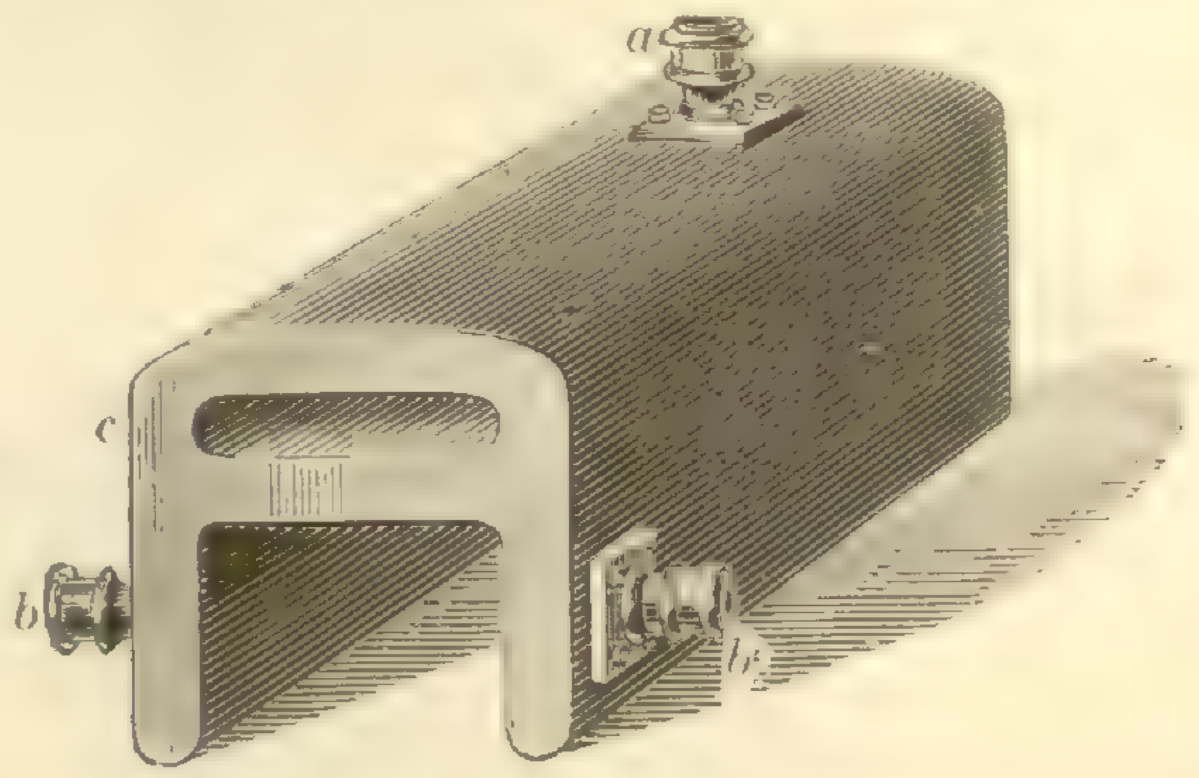


FIG. 172. FLUE AND TERMINAL END SADDLE BOILER.
a, Flow Pipe; *b*, *b*, Return Pipes; *c*, Flue.

Terminal End Saddle (see Fig. 172). It is a wrought welded boiler, made in sizes varying in length from 2ft. to 5ft., heights and transverse inside measurements being in proportion. The approximate Heating power of one of these boilers, 2ft. long, is given as 500ft. of 4in. piping; 3ft. long as 800ft.; and 5ft. long as 2000ft.; the unequal proportion, in results corresponding with length, being accounted for by the enlargement of all parts, and the variation in height and width. The flue extends nearly to the back, and through it the whole of the heat must pass from the fire. Sometimes, another flue is formed with bricks on the outside surface, as with the ordinary Saddle; at others, the whole is covered with an arch without any division. As the full surface of the boiler on both sides is exposed to heat, nearly the fullest possible amount is absorbed before reaching the chimney.

The Gold Medal Boiler (see Fig. 173), so named from that award being conferred on it after a working competition at the Birmingham Exhibition in 1872, is of wrought iron, and virtually a flued Saddle with a terminal end, the flue being in the form of three chambers instead of one,

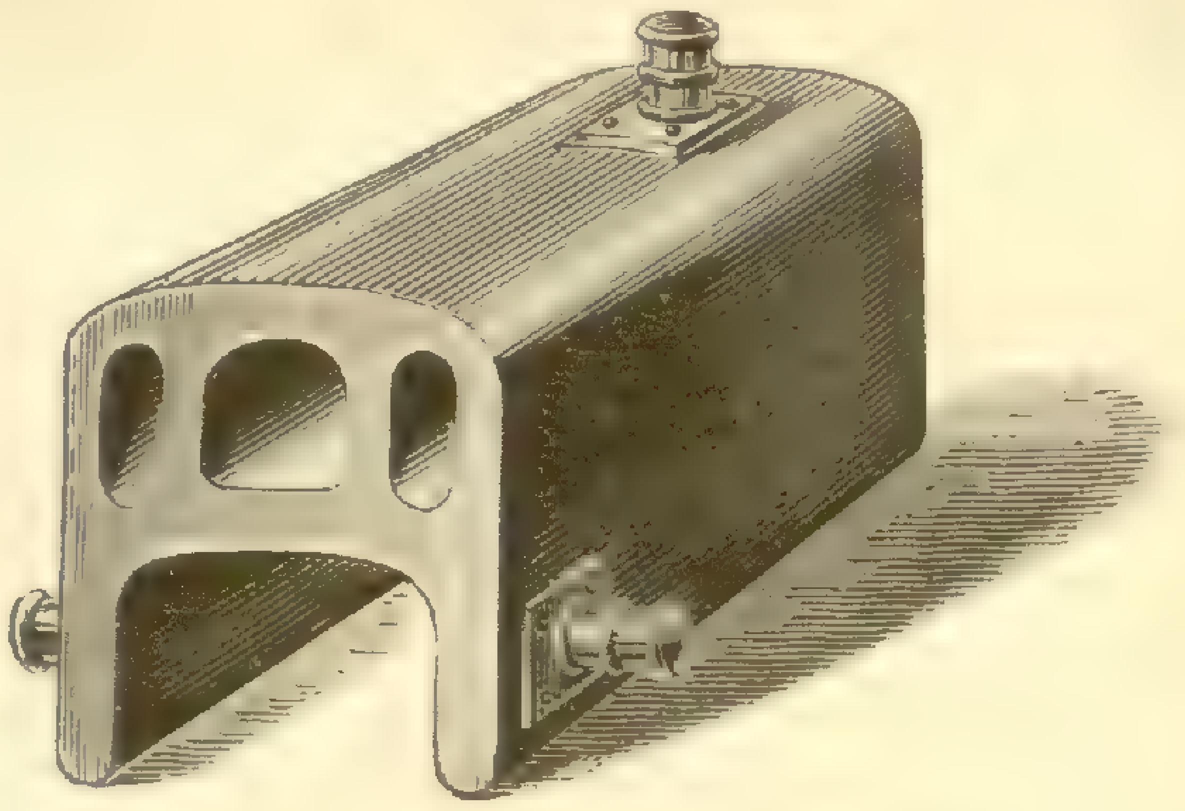


FIG. 173. THE GOLD MEDAL BOILER.

as in that previously noticed. This boiler maintains a high position, and a large number are in use. Various sizes are made, ranging from 2ft. to 6ft. long, and proportionately large in all parts. The approximate Heating power of one 2ft. long, is 500ft.; that of 4ft., 1700ft.; and that of 6ft. in length, 3500ft.—all of 4in. piping.

Heating—*continued.*

Another modification of a saddle boiler is the Cruciform (see Fig. 174). It combines great Heating power with economy of fuel; the formation of its flues, in the

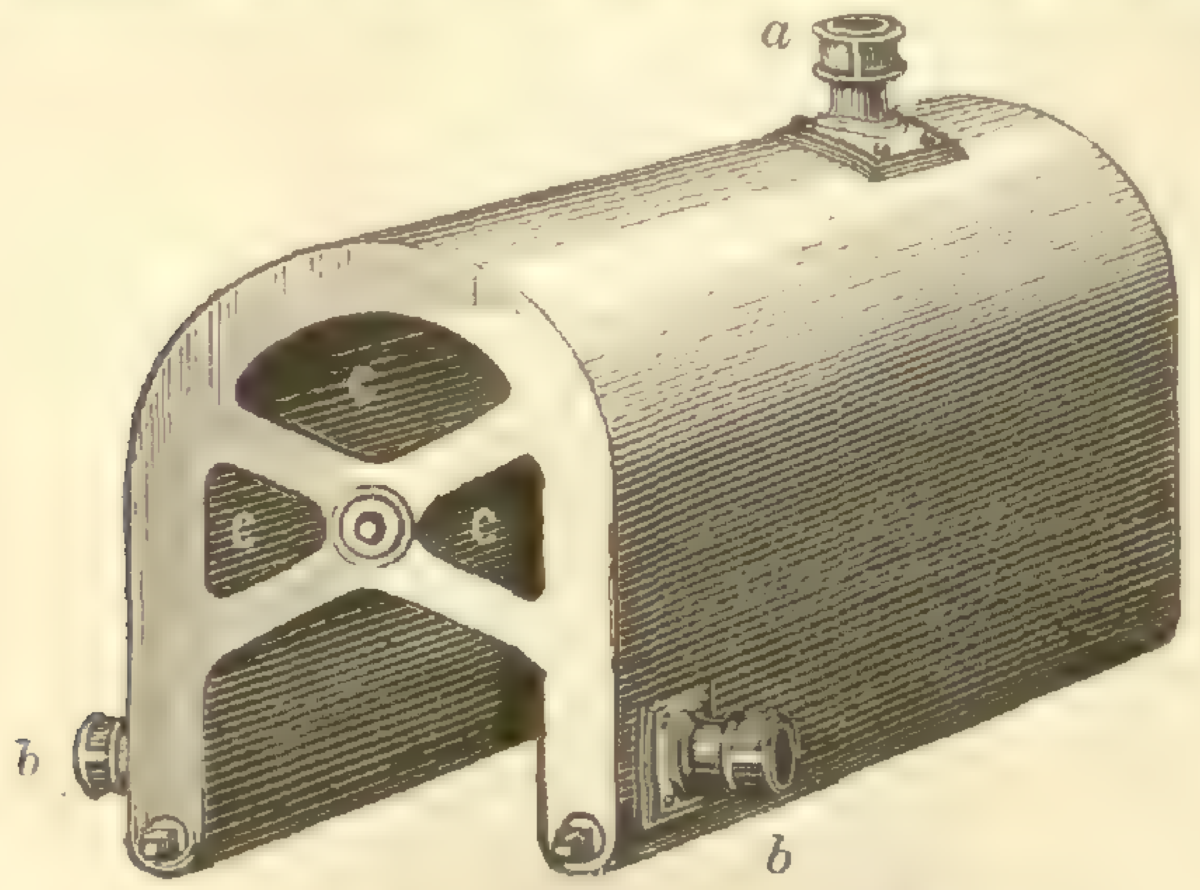


FIG. 174. CRUCIFORM SADDLE BOILER.

a, Flow Pipe; *b*, *b*, Return Pipes; *c*, *c*, *c*, Triangular Flues.

shape of a cross, being such as conduces to a free circulation of water, without the disadvantage of resting-places being in them for sediment. Approximate Heating power is much the same as in the Gold Medal Boiler.

The Climax is a wrought-iron saddle boiler, somewhat like the Gold Medal, but having only two chambers in the interior, instead of three. It has a waterway both at back and front, and is fed from the top instead of the furnace door. This latter arrangement has now been introduced into other forms of saddle boilers, it being considered advantageous in saving labour in stoking. There are various other modifications of the saddle in use, where more chambers are made in the crown part or on the sides. Those already noticed will be found thoroughly efficient, and, not being complicated in construction, are much to be preferred.

A powerful boiler for Heating great lengths of piping, on account of its form being specially adapted for sustaining heavy pressure, is the Improved Cornish or

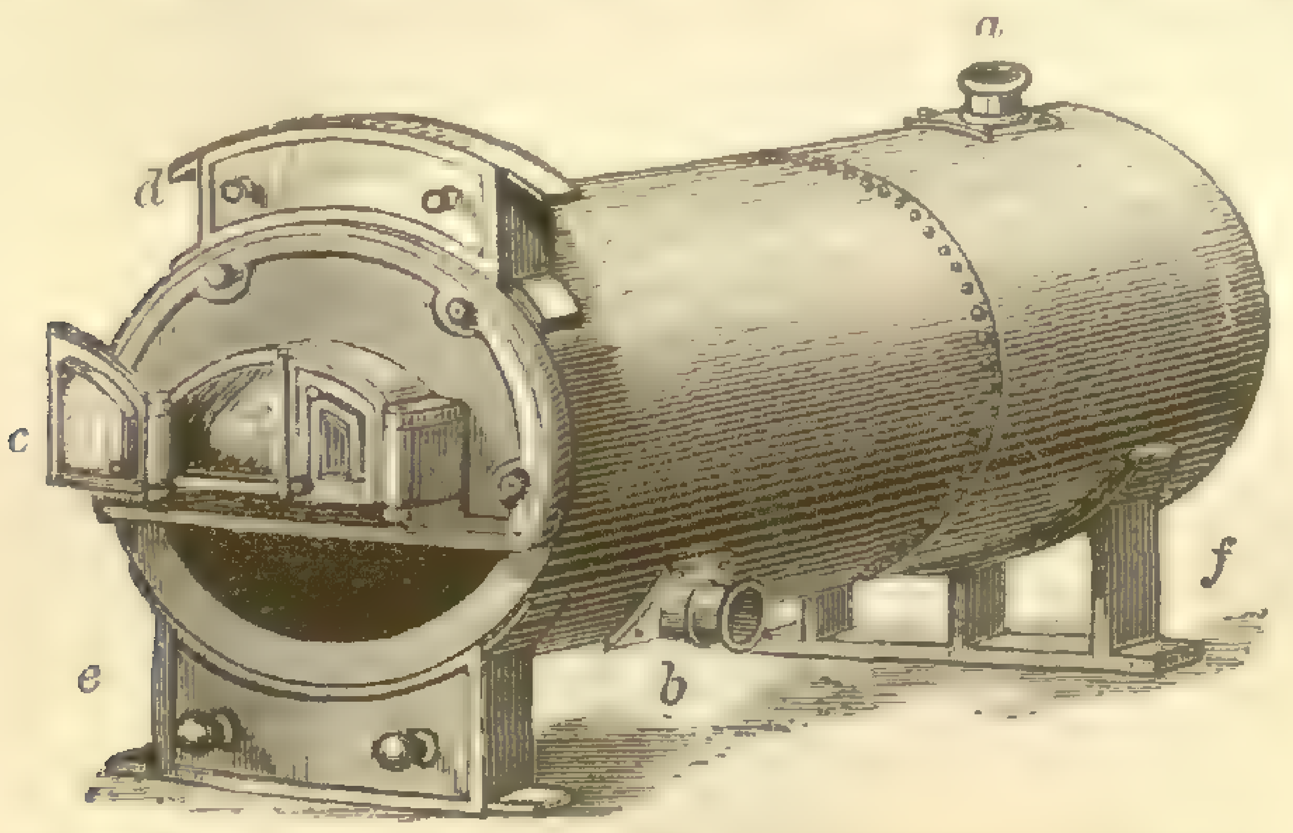


FIG. 175. IMPROVED CORNISH OR TRENTHAM BOILER.

a, Flow Pipe; *b*, Return Pipe; *c*, Furnace Door; *d*, Upper Flue Door; *e*, Lower Flue Door and Front Stand; *f*, Back Stand.

Trentham Boiler, represented in Fig. 175. It consists of two wrought-iron cylinders, strongly riveted together, about 2in. of water space being allowed between them. The door frame is attached to one end, and the fire bars are inside the cylinder near the bottom, which forms an ash-pit, the upper, or larger, portion being the furnace. In fixing, the boiler is stood on two cast-iron stands, the front one forming a frame for the lower flue doors. Walls are built clear of the boiler on either side, and upper and lower flues formed by a course of fire bricks being fixed against the side of the cylinder about half-way up; an arch spanning the top from this. The heat is conducted through the centre, over the top by the upper flue, and then returns by the bottom one to

Heating—*continued.*

the chimney, thus exposing the fullest possible amount of water space to the action of the fire. The minimum approximate Heating power of this boiler, 5½ft. long by 3ft. diameter, is given as 2000ft. of 4in. piping; and one 8ft. long by 3½ft. diameter is calculated to heat 5500ft. of the same sized pipes.

Tubular boilers are composed of a series of cast-iron tubes placed either in an upright or a horizontal direction, and connected together for the free circulation of water in all parts. Some are cast in one piece—an objectionable system, as any defect in casting, or an accident, may cause a leakage at any time, which, if serious, would render the whole useless. To meet this objection, and effect further improvements, Messrs. Weeks and Co., of Chelsea, have provided, in their notable and widely-used Duplex Upright tubular boilers with diaphragm, a system by which the whole may be worked together, or, in the event of an accident to one part, that half of the boiler may be removed and the other still kept working until repairs are finished. Duplicate parts are kept for replacing those which become defective, without the necessity of substituting a new boiler. Water tubes inclose the furnace, and small horizontal ones are placed as fire bars. The fuel is admitted at a circular hole in the top, which is provided with an iron cover. Rivers' Patent is a rather expensive, but a powerful, tubular boiler, which may be practically termed indestructible. It has a double row of horizontal tubes, forming a semicircle above the fire, which is fed from the furnace door. On any one of the tubes becoming defective, it can be replaced by a duplicate in a very short time, and the Heating conducted as before. These boilers are in use, in some instances, where enormous lengths of pipes are connected; but it should be stated that they have not been sufficiently tried to prove whether they would be equally satisfactory in all cases. They are noted for rapid circulation.

FIG. 176. UPRIGHT CYLINDER BOILER. FRONT ELEVATION.

For Heating a small or moderate-sized house, such as those frequently possessed by amateurs, a portable Upright Cylinder Boiler and Furnace, similar to that shown in Figs. 176 and 177, is well suited. It may be placed near

Heating—*continued.*

one end, or even inside a house, as no bricks are required for setting, and the smoke may be conducted from the flue to the outside by a circular pipe or chimney. The exterior view of these independent boilers presents a neat appearance; but it is not advisable to place them inside the

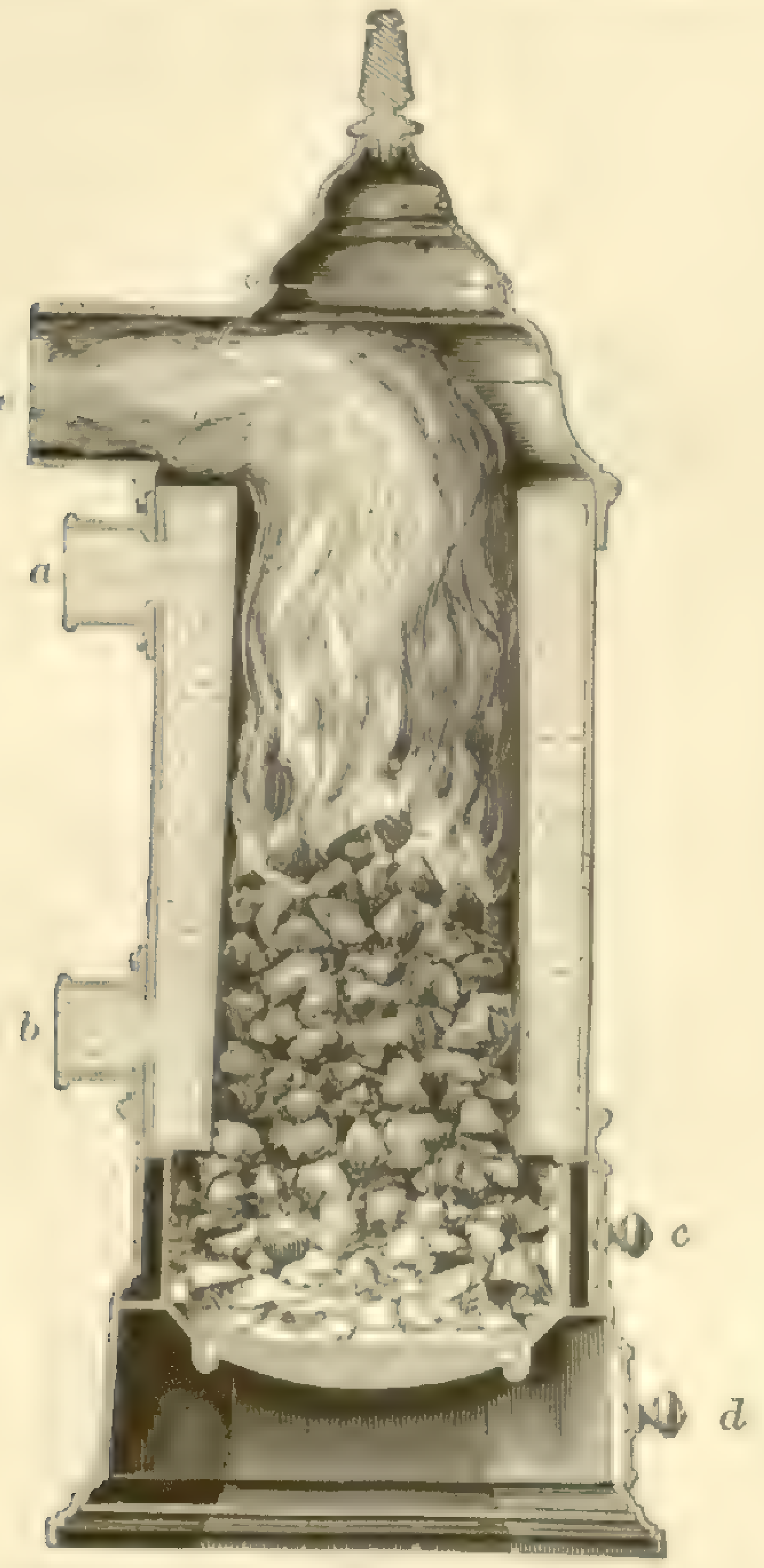


FIG. 177. UPRIGHT CYLINDER BOILER. VERTICAL SECTION.

a, Flow Pipe; *b*, Return Pipe; *c*, Fire Door; *d*, Ash-box Door, with Ventilator; *e*, Smoke Flue.

plant house if it can be avoided, on account of their drying effect on the air. Independent cylinder boilers are made both with and without an extended top for adding fresh fuel.

Small greenhouses are occasionally heated with boilers warmed by gas instead of ordinary fuel. This method is rather expensive to keep sufficient water in circulation for raising or maintaining a medium temperature in a large glass house. It is, however, a convenient mode of excluding frost from small structures in places where a

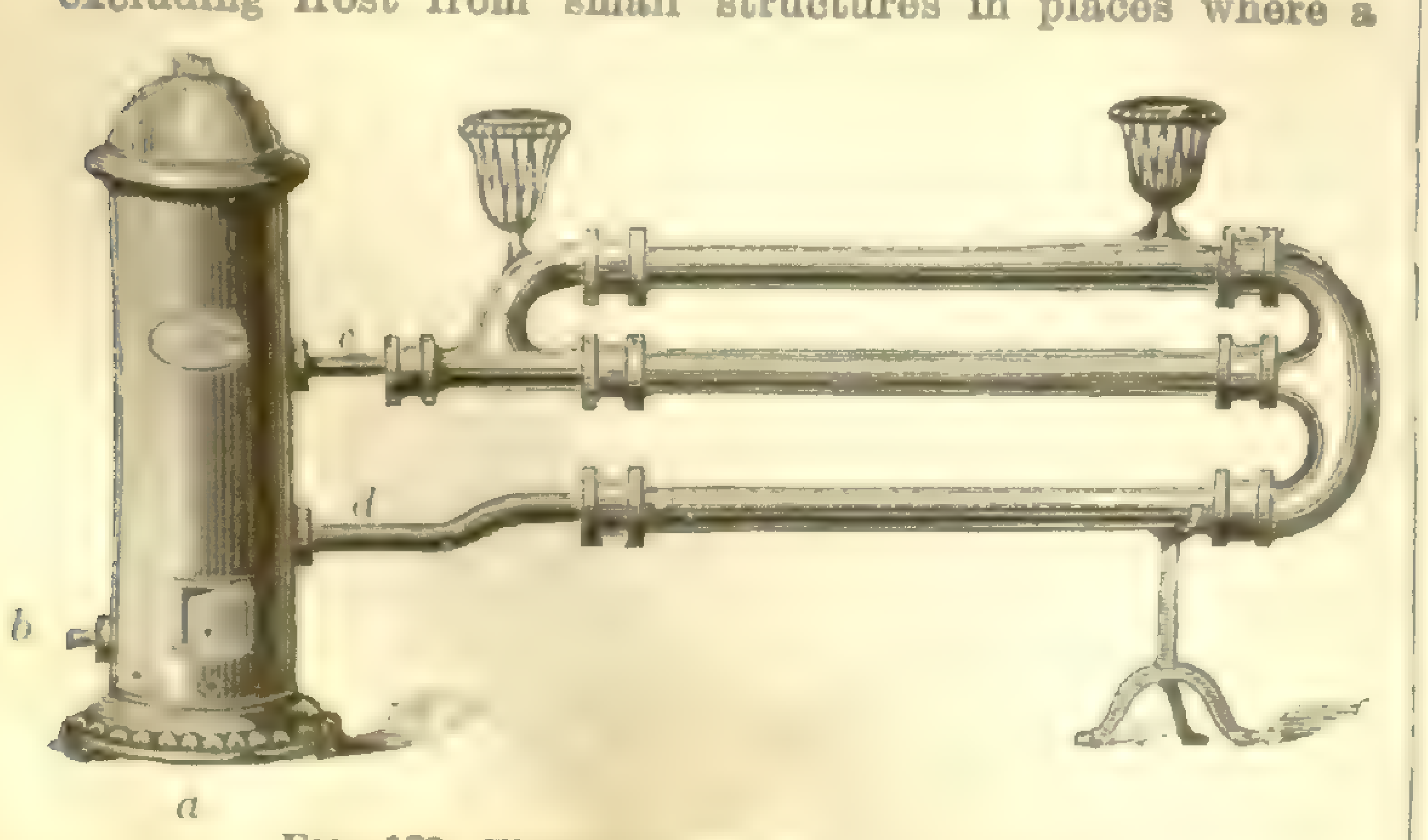


FIG. 178. WRIGHT AND CO.'S GAS BOILER.

a, Boiler, consisting of Heating Coil, inclosed in a case; *b*, Connection of Burners with Gas-pipe; *c*, Flow Pipe; *d*, Return Pipe.

plentiful supply of gas can be obtained. It has an advantage for those who do not require much heat, and

Heating—*continued.*

who are unable to attend to fires. When once started at the proper rate, the water will continue to warm and circulate so long as the gas keeps burning. A little additional water is necessary in the supply cistern occasionally. Gas boilers, of which Messrs. Wright and Co.'s is a good arrangement (see Fig. 178), consist of a heating coil of pipes arranged above one or more Bunsen burners inside an inclosed case, and having a flow pipe attached, which branches into another, as shown in the illustration, and returns to the lower part of the boiler. With a small flue attached, the whole apparatus can stand in the house it has to warm, and thus the full amount of heat will be utilised. The product of combustion from a Bunsen burner is merely a slight vapour, sufficient oxygen being incorporated with the gas, so soon as it leaves the pipe, to cause its whole consumption by the fire without any soot being left. Two stoves heated by gas, and answering

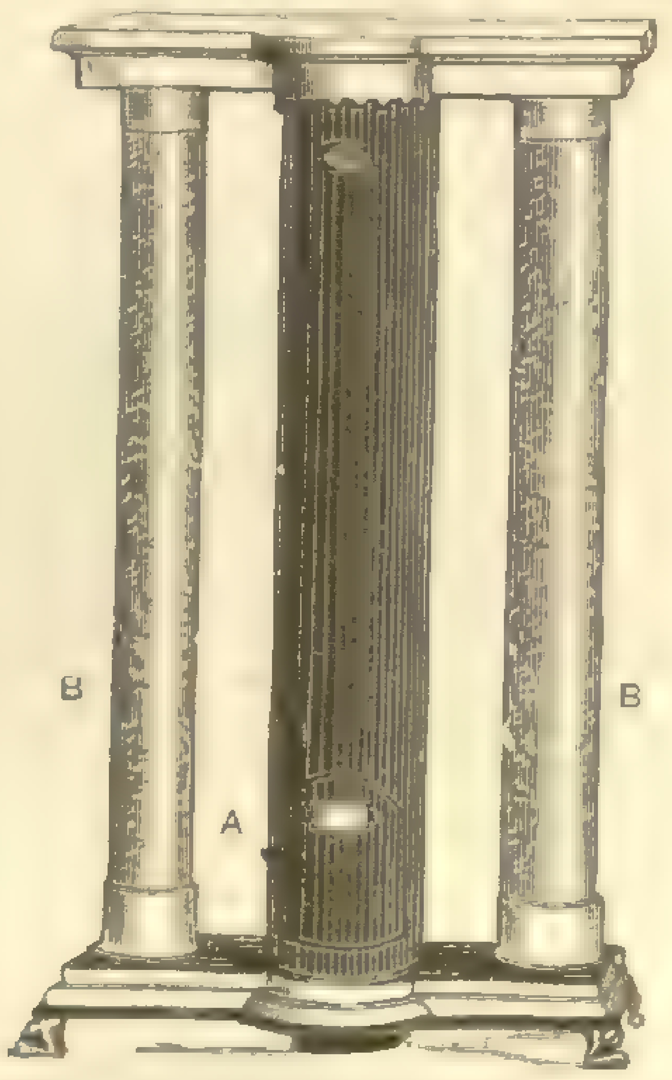


FIG. 179. RITCHIE'S LUX CALOR.

A, Door, which opens on a Bunsen burner; B, B, Tubes, in which the products of combustion are condensed (with the exception of the carbonic acid) into fluid form.

without flues, are Ritchie's Lux Calor (see Fig. 179) and Clark's Syphon Condensing Stove, represented in Fig. 180; both having Bunsen burners attached. In the Lux Calor, the products of combustion, with the exception of carbonic acid, are condensed in tubes on either side of the burner.

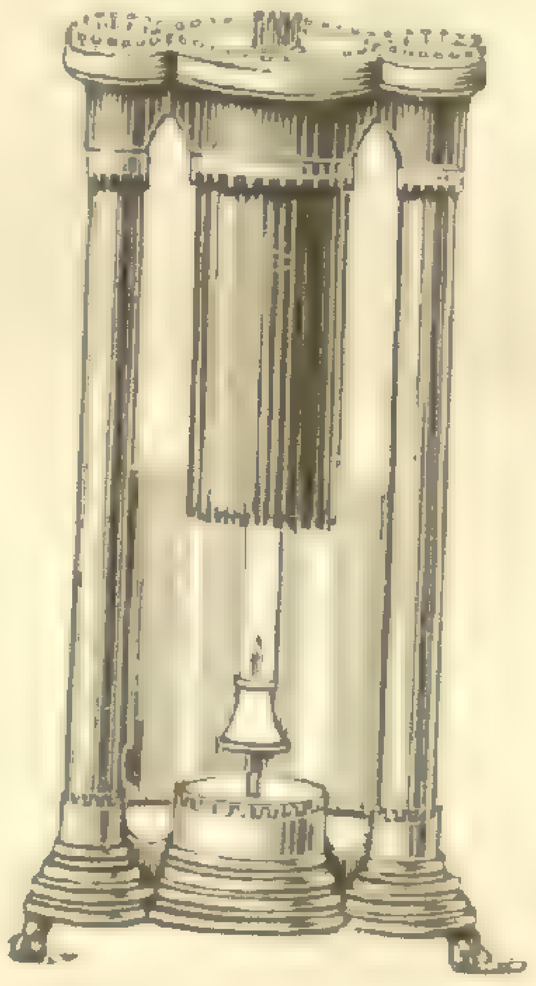


FIG. 180. CLARK'S SYPHON CONDENSING STOVE.

There is little fear of the small amount of carbonic acid gas doing injury, as, being heavier than atmospheric air, it falls to the lowest point, and is removed by any feeble current. This stove is calculated to warm any fairly good structure, not too much exposed, with an interior capacity not exceeding 1000 cubic feet. The Syphon Condensing Stove is constructed on somewhat the same lines as the Lux Calor; but, unlike it, the warm air is—after parting with the products of combustion—conveyed through a tube over the flame and into the space to be

Heating—*continued.*

warmed; an additional amount of purity in the air being claimed by the inventor in consequence of this process. The Syphon Condensing Stove is considered useful and available for small lean-to or other houses, containing a cubic capacity of from 600ft. to 800ft., in places inaccessible to a hot-water apparatus.

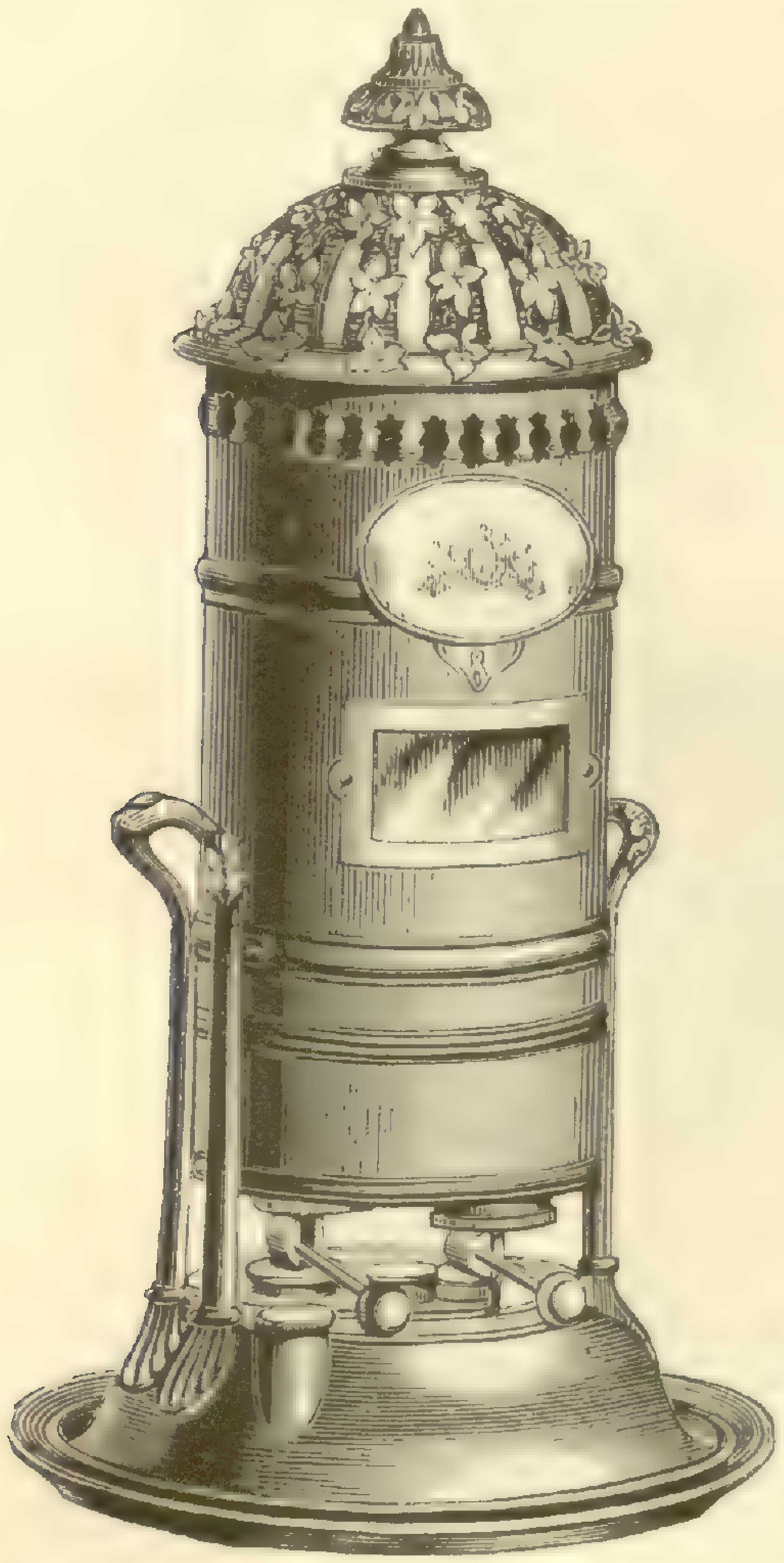


FIG. 181. MINERAL OIL STOVE, WITH DOUBLE BURNERS.

Mineral oil stoves (see Fig. 181) are perforce used by amateurs for excluding frost from small houses in winter. They are objectionable on account of the strong smell caused by the oil when burning, but are useful where no other means of Heating can be procured, or as a substitute at times when a permanent apparatus gets out of order. Large oil stoves with double burners emit a considerable amount of heat, and materially raise the temperature in a small house.

All boilers should be provided with a tap near the bottom, for emptying, in case of repairs, or for removing sediment that collects inside. Air taps must be fixed in the highest points of the flow pipes, or, better still, a small lead tube may be connected and carried up the inside of the house, higher than the level of any part of the apparatus. Hot-water pipes are usually made of cast iron, and the joints may be connected with various compositions, such as cement, red and white lead mixed, steel filings, &c. Each substance is largely used by different Heating engineers, the last-named being perhaps the oldest, and—when mixed with the proper proportion of sal-ammoniac, and a little sulphur, to cause rusting — the most substantial method; it is, however, more difficult to disconnect joints made with this preparation than when red lead is employed. Strong hemp packing, in addition, will be requisite in either case. Some persons prefer joints made with flanges, and screwed together, with vulcanised indiarubber washers between. These occupy more space

Heating—*continued.*

than ordinary sockets, but have the advantage of being easily replaced. Indiarubber rings also make good joints, and are quickly renewed or removed in cases of necessity. They are made of the proper size, and placed on the smaller end of one pipe, which is then pushed into the socket end of the other. All pipes in use should rest on firm walls or stands prepared for them; sufficient room for expansion being allowed on each side, and at the ends. To insure a free circulation, the interior must be kept free from air, and all valves should be capable of opening a waterway as nearly as possible the full size of the pipe. A water cistern must be provided, and fixed at a higher level than any part of the apparatus it has to keep supplied.

HEBECLADUS (from *hebe*, pubescence, and *klados*, a branch; in reference to the hairiness of the young shoots). ORD. *Solanaceæ*. A genus containing about five species of stove perennial herbs or sub-shrubs, natives of Western tropical America. They thrive in a rich sandy loam and leaf mould. Propagated by cuttings, made from half-ripened wood, and inserted in sand, under a bell glass, in bottom heat.

H. biflorus (two-flowered). *fl.*, peduncles axillary, solitary, forked or trifid, bearing two (rarely three) handsome drooping flowers; calyx glabrous, with five spreading segments; corolla of two colours, 1in. or more long; tube conico-cylindrical, purple, hairy, striated; limb of five spreading, green, narrow-lanceolate segments; stamens much exserted; anthers blue-purple. August. *l.*, lower ones solitary, alternate; upper ones in unequal pairs, sub-ovate, shortly petiolate, acute. Branches more or less spreading, terete, glabrous. Andes of Peru, 1844. Sub-shrub. (B. M. 4192.)

H. ventricosus (ventricose). *fl.* one or two together, on short drooping peduncles from the axils of the leaves; calyx finely pubescent, toothed; corolla pale yellow, ½in. broad and deep; limb toothed. Summer. *fr.* a large, glabrous, poisonous berry. *l.* shortly stalked, ovate, acute, entire, or slightly sinuate-dentate; upper surface bright medium green; the lower paler. *h.* 3ft. to 4ft. Peru. Shrub. (Ref. B. 208.)

HEBECLINIUM. *See* **Eupatorium.**

HEBENSTRETIA (named in honour of John Ernest Hebenstreit, 1703-1757, Professor of Botany in the University of Leipsic). ORD. *Selagineæ*. A genus containing about twenty species of greenhouse evergreen shrubs, sub-shrubs, or annual herbs, natives of South Africa (one extending to Abyssinia), few of which are seen in cultivation. Flowers white or yellow, sessile; spikes terminal, often dense, short or elongated. Leaves alternate or scattered. The species thrive in a compost of sandy fibry loam, with the addition of a little peat. Propagated by cuttings, made of short young shoots, and inserted in sandy peat, under a bell glass, in spring. *H. dentata* is increased by seed.

H. dentata (toothed). *fl.* white; spikes smooth. May to September. *l.* linear, toothed. *h.* 1ft. 1739. Annual. (B. M. 483.)

H. fruticosa (shrubby). *fl.* white, in oblong spikes, disagreeably scented at night; calyx small, bipartite; corolla tube longer than calyx, filiform; bracts entire, ovate, acuminate, sometimes ciliate. August. *l.* linear-lanceolate, dentate or rather pinnatifid-dentate, smooth when full grown; young ones somewhat hairy along the midrib on the under side. Stems shrubby. *h.* 1½ft. 1816. (B. M. 1970.)

H. integrifolia (entire-leaved). *fl.* white. May and June. *l.* linear, quite entire. *h.* 1ft. 1792. (A. B. R. 252.)

HECHTEA (named after J. H. G. Hecht, a Prussian Counsellor, who died in 1837). ORD. *Bromeliaceæ*. A genus containing about six species of pretty greenhouse herbs. Flowers small, disposed in a compound spike. Leaves long, spiny, crowded, recurved, subulate, linear. For culture, *see* **Tillandsia.**

H. argentea (silvery).* *fl.* white, small, in globose clusters. *l.* in a dense rosette, sharply recurved, rigid, 1½ft. to 2ft. long. General habit of *H. Ghiesbreghtii*, but very distinct by reason of the dense silvery coating of both leaf surfaces. Mexico.

H. cordylinoides (Cordyline-like). *fl.* numerous, small, in a much-branched panicle. *l.* lanceolate, recurved, remotely and strongly saw-toothed. Mexico, 1881. Habit tufted. (B. M. 6554.)

Hechtea—*continued.*

H. Ghiesbreghtii (Ghiesbreght's). *fl.* whitish, insignificant, small, clustered on tall slender scapes. *l.* rosulate, recurved, spiny, very ornamental, purple and green, silvery below. Mexico, 1863. (B. M. 5842.)

HEDAROMA. *See* **Darwinia.**

HEDERA (the old Latin name for the Ivy, used by Virgil and Pliny). Ivy. ORD. *Araliaceæ.* A genus, as now limited, containing but a couple of species of tall climbing shrubs, of which the one—in one or other of its numberless forms—is widely distributed throughout the Northern hemisphere, and the second confined to Australia. Flowers polygamous; umbels paniculate. Leaves undivided, lobed or pinnate, compound. Few plants are more serviceable in both large and small gardens than the old-fashioned Ivy, scarcely any situation being unsuitable for it. In a good rich soil, growth is much more rapid than in a poor one; and strong plants, grown first in pots before placing out, well repay for the extra preparation thus made, by covering their allotted space in a much shorter time. Ivy is now extensively used to cover open railings, as an arbour, as an edging plant, as a "screen" for a drawing-room, for hanging baskets, and in several other ways. When established, it is advisable to clip off all the old leaves annually, about April, as a close growth is thereby induced, and the old foliage is soon replaced by new. Propagation is readily effected by cuttings of any moderately firm young shoots, inserted in pots, or in the open ground, preferably in autumn. The tree forms and their numerous sports are grafted, any common strong-growing climbing form being used as a stock. The others may also be grafted, and the rarer variegated ones usually are, as this method of increase is a much more rapid one than cuttings. If cuttings are inserted in heat, and kept shaded until roots are formed, good plants are obtained in much less time than when placed in a cold frame, or in the open air.

H. australiana (Australian). *fl.*, umbels pedunculate, with the peduncles almost verticillate along the elongated branches of a large, loose, terminal panicle. *l.* large, pinnate, the rachis articulate; leaflets few, ovate, oval-oblong or ovate-lanceolate, shortly acuminate, often above 6in. long, smooth and shining, but prominently veined. Queensland. A small, quite glabrous, greenhouse tree.

H. canescens (hoary). A synonym of *H. Helix algeriensis.*

H. Cavendishii (Cavendish's). A synonym of *H. Helix marginata minor.*

H. cordata (heart-shaped). A synonym of *H. Helix scutifolia.*

H. elegantissima (most elegant). A synonym of *H. Helix marginata rubra.*

H. grandifolia (large-leaved). A synonym of *H. Helix canariensis.*

H. Helix. Common Ivy. *fl.* yellowish-green; borders of the calyx entire; petals five, broad and short; stamens five. Autumn. *l.* thick and shining, ovate, angular, or three or five-lobed; those of the barren stems usually much more divided than the upper ones. Western and Southern Europe, Northern Africa, and West Central Asia; extending over the whole of Britain. Of the innumerable forms, the following are the best:

FIG. 182. HEDERA HELIX ALGERIENSIS VARIEGATA.

H. H. algeriensis (Algerian).* *l.* yellowish-green, varying from entire broad-ovate or orbicular to a peculiar rounded three-lobed form. A fine rapid-growing variety, with large leaves of a cheerful green. SYN. *H. viridis* (S. H. Ivy, 99). There is a variegated form of this, which, although not particularly attractive in a young state, is handsome when thoroughly established. SYN. *H. canescens.* See Fig. 182.

FIG. 183. HEDERA HELIX ARBORESCENS AUREA MACULATA.

H. H. arborescens (arborescent). This is the "tree" form of the common native Ivy of our woods and hedge banks. There are sub-varieties, with golden (see Fig. 183) and silver variegation, and one with yellow berries.

H. H. aurantia (orange).* *l.* like those of *H. H. chrysocarpa*, but fruits of a beautiful reddish-orange colour. (R. H. 1884, 84.)

FIG. 184. HEDERA HELIX CONGLOMERATA.

H. H. canariensis (Canary Islands). Irish Ivy. This is the common large-leaved climbing Ivy—the best of all for quickly clothing walls, or for forming a green carpet under trees or on banks where grass, &c., refuses to grow. *l.* deep green, usually five-lobed; terminal lobe largest. The fertile state of this, *i.e.*, that which has outgrown the climbing stage, and produces flowers and fruit, has entire ovate leaves, and is propagated by grafting on the type; it is generally known in nurseries under the name of *H. H. arborescens.* SYN. *H. grandifolia.* There is a variegated form of this, but it is very apt to revert to the type.

FIG. 185. HEDERA HELIX DENTATA.

Hedera—*continued.*

H. H. chrysocarpa (golden-fruited).* *l.* smallish, sometimes nearly triangular and three-lobed; central lobe frequently prolonged, with a few sharp lobes or notches; colour greyish-green; principal veins lined with markings of a lighter shade. A quick-growing climber.

H. H. conglomerata (crowded).* A marked, slow-growing, erect variety, with small, wavy leaves, and very short internodes. An excellent subject for rockwork. See Fig. 184.

H. H. cuspidata minor (smaller cuspidate). *l.* uniformly three-lobed, the lobes equal and crenated; colour a deep rich glossy green, with whitish veins. A pretty small-leaved variety, with bright reddish-purple leaf-stalks, and stems purplish when young.

H. H. deltoidea (deltoid). *l.* bluntly deltoid, blackish-green, changing in autumn to a dull purplish-bronze. Stem purplish, rather stout. A distinct wall Ivy. (S. H. Ivy, 75.)

H. H. dentata (toothed). A large handsome Ivy, somewhat like *H. H. Rægneriana*, but with less glossy leaves, which are not unfrequently distinctly toothed. See Fig. 185.

FIG. 186. HEDERA HELIX DIGITATA.

H. H. digitata (digitate). *l.* more decidedly digitate than in most other Ivies, blackish-green, with whitish veins. A rather vigorous grower, and an excellent Ivy for walls. See Fig. 186. *H. H. Caenwoodiana* is a plant which scarcely differs (if at all) from *H. H. digitata.*

FIG. 187. HEDERA HELIX DONERAILENSIS.

H. H. Donerailensis (Donerail's).* A very pretty, small-leaved form, with leaves which assume a dull purple-brown colour in winter. A neat, compact plant, of medium rate of growth, good for walls, or for pot culture. See Fig. 187.

FIG. 188. HEDERA HELIX LOBATA MAJOR.

Hedera—*continued.*

H. H. Glymii (Glym's). *l.* varying in form from regular ovate to long wedge-shaped, many of them being obscurely three-lobed; colour a very glossy, deep dull green. A fine and distinct form, of a wiry habit of growth. One of the best for pot culture.

H. H. gracilis (slender). *l.* usually three-lobed; colour rather light dull green, richly bronzed in autumn. Stems wiry, purplish. A very pretty variety for covering a wall or a tree stump. (S. H. Ivy, 66.)

H. H. lobata major (larger-lobed). *l.* three to five-lobed (in old plants, large), deep glossy green. A good, vigorous grower. See Fig. 188.

FIG. 189. HEDERA HELIX LUCIDA.

H. H. lucida (glossy). *l.* frequently deltoid, glossy; larger ones, in vigorous plants, with from three to five somewhat indistinct lobes. A fast grower, suitable for clothing walls and tree stumps, or for pot culture. See Fig. 189.

H. H. luteola (yellowish-tinted). *l.* from broadly ovate to irregular rhomboid, occasionally three-lobed; stems and petioles usually green, sometimes slightly purplish; central parts dark green, mottled with grey; margin broad, of a yellowish cream colour. A fine tree Ivy, of robust habit, and an excellent form for pot culture.

H. H. marginata (margined). *l.* bluntly triangular; ground colour dull green, margined with creamy-white, brilliantly striped with red or pink in autumn. A somewhat slow-growing form. (S. H. Ivy, 78, 88.)

H. H. marginata aurea (golden-margined). *l.* elongate triangular, bordered with faint orange-yellow, turning to red. An excellent Ivy for walls.

H. H. marginata minor (lesser margined). A pretty but slow-growing form, with smaller leaves than *H. H. marginata.* Not vigorous enough for walls, but a desirable plant for cultivation in pots. SYN. *H. Cavendishii.*

H. H. marginata rubra (red-margined). This differs from *H. H. marginata* in the bright deep rosy-red hue of the extreme edge of the leaf; the red colour does not appear until autumn, and disappears in spring. A slow-growing variety. SYNS. *H. elegantissima, H. tricolor.*

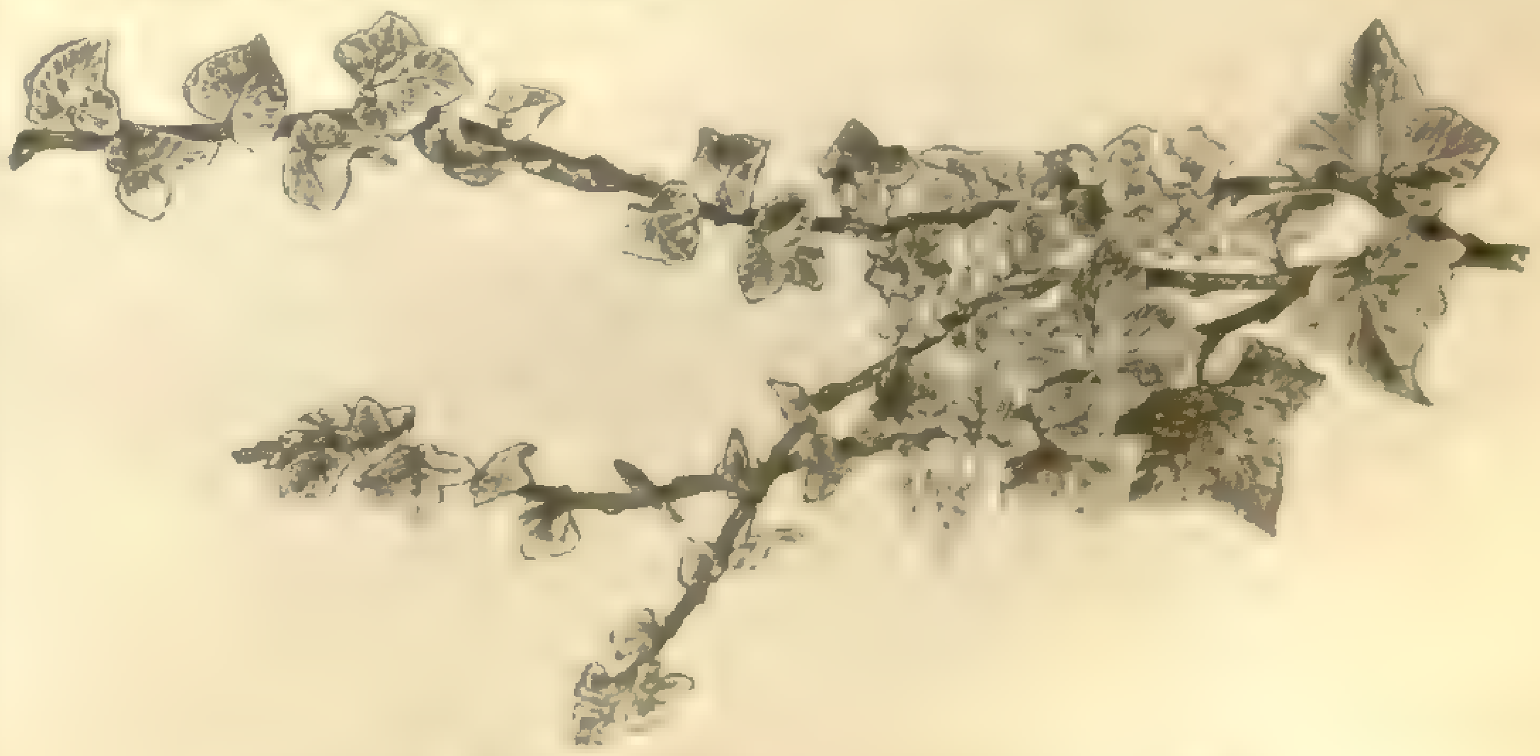


FIG. 190. HEDERA HELIX MARMORATA MINOR.

H. H. marmorata (marbled). A large-leaved form, of vigorous habit, with irregular blotches of a creamy-white colour. Good for walls or rough rockwork. Another and very distinct sub-variety is *marmorata minor*, with much smaller leaves. The variegation of this, too, is less apt to "run out" than that of the larger form. See Fig. 190.

H. H. palmata (palmate). *l.* medium-sized, three to five-lobed; colour a dull deep green. This, in a young state, much resembles *H. digitata*, but, when mature, is distinct enough to deserve a varietal name. A neat, but rather slow grower. (S. H. Ivy, 75.)

H. H. pellucida (translucent). *l.* medium size, bluntly quadrangular, mottled with green and white, or white and semi-transparent. Young stems red. Habit robust.

H. H. purpurea (purple). A climbing Ivy with leathery leaves like those of *H. Rægneriana*, but of a purplish colour.

H. H. Rægneriana (Rægner's).* *l.* large, dark green, leathery, broadly cordate. A handsome and distinct variety, of vigorous habit. The arborescent form of this is the most striking of all the tree Ivies. See Fig. 191.

Hedera—*continued.*

FIG. 191. HEDERA HELIX RÆGNERIANA.

H. H. rhombea (rhomboid).* *l.* rhomboid, green, narrowly margined with creamy-white. A distinct form of medium, or, rather, small size, and of somewhat slow growth.

H. H. sagittæfolia (arrow-leaved). *l.* usually bluntly three-lobed, the central lobe projecting forward in the form of a letter V; colour a dull dark green, with a few patches of blackish-bronze, which change, in autumn, to a rich purplish-bronze; principal veins light green. A free grower, of wiry habit. (S. H. Ivy, 69.)

H. H. scutifolia (shield-shaped-leaved). *l.* medium size, roundish triangular, or obscurely three-lobed, dull green; veins obscurely marked. A distinct variety, but not a robust grower. SYN. *H. cordata.* (S. H. Ivy, 74.)

FIG. 192. HEDERA HELIX VARIEGATA.

H. H. variegata (variegated). This, one of the numerous variegated forms of our native Ivy, has lighter green leaves, margined and blotched with creamy-white. It keeps very constant, and, although not so quick a grower or so handsome as some others, is well worth a place against a wall or an old tree trunk. See Fig. 192.

H. H. Willseana (Wills's). This is a dark-leaved form, nearly allied to *H. H. lobata major*, from which it differs in the veins being less distinctly marked, and in the colour being much darker in the summer, and in winter deepening to almost black. SYN. *H. nigra.* (S. H. Ivy, 62 and 72.)

H. nigra (black). A synonym of *H. Helix Willseana.*

H. tricolor (three-coloured). A synonym of *H. Helix marginata rubra.*

H. viridis (green). A synonym of *H. Helix algeriensis.*

HEDERACEÆ. A name given to the order *Araliaceæ.*

HEDGEHOG THISTLE. *See* **Echinocactus.**

HEDGE HYSSOP. *See* **Gratiola.**

HEDGE MUSTARD. *See* **Erysimum.**

HEDGES. Hedges of various descriptions are extensively planted in connection with gardens. They may either form the boundary fence, or be intended for screens, shelter, &c. Various shrubs and plants are available for utilising, according as any one may succeed better than another, or to suit the special requirement for which the Hedge is intended. Different soils and localities must also be taken into consideration. Box, Privet, Thuja, &c., succeed almost anywhere as Hedges, the last-named doing best on rather heavy soil; but neither is suited for anything beyond a screen where there is a paling as well, or for dividing one part of a garden from another. As a boundary fence, Whitethorn and Beech, planted together when young, and afterwards kept frequently cut in, form, eventually, a Hedge which is practically impassable. Blackthorn may also be similarly used, but it has the disadvantage of throwing up quantities of suckers from creeping roots. The Myrobalan, or Cherry Plum (*Prunus cerasifera*) is sometimes used, and forms, when established, an excellent Hedge. It is, moreover, very attractive when in flower. Hornbeam grows quickly, and makes a capital deciduous Hedge, either for a boundary or for shelter. Common Laurel may also be planted for the purpose, but it is liable to injury from severe frosts. Yew and common Holly make the thickest and best Hedges for shelter. The former is rather slow-growing, and both succeed best on a rich, rather heavy soil. Hollies transplant readily in April or September, when of a good height; consequently, a full-sized, thick Hedge may be at once secured in necessary cases. When inserting young plants, autumn or early spring should be selected for the operation; the ground should be previously well prepared by trenching, and by the addition of a little manure, if it is poor. In the case of a Hedge which is eventually to be a boundary division for keeping cattle, &c., out of a garden inclosure, a wooden fence will be requisite for some time as well. This may be made of rough posts, with long bars fitted in them. Thorns should be cut nearly to the ground the first year, and stopped enough afterwards to keep them thick at the bottom. They should be trimmed once or twice each summer after becoming established. Holly and Yew Hedges are usually clipped, with shears, in September, when growth is completed. Broad-leaved shrubs, such as Laurels, should be cut in with a knife, in preference to shears, which sever the leaves, rendering them unsightly, and the Hedge exceedingly formal. Young Hedges are much improved, and their growth encouraged, when the soil is kept open round their roots with a hoe or fork, which also destroys weeds at the same time.

HEDWIGIA (named after John Hedwig, 1730-1799, a celebrated muscologist and Professor of Botany, at Leipsic). SYNS. *Caproxylon, Tetragastris.* ORD. *Burseraceæ.* A genus containing four or five species of glabrous trees, natives of the West Indies, Northern Brazil, and Guiana. *H. balsamifera*, the species best known to cultivation, is a tall-growing stove evergreen tree, yielding an exudation of a balsamic nature. It requires a sandy loam soil, with a little peat added. Propagated by ripened cuttings, inserted in sandy soil, in a rather strong heat.

H. balsamifera (balsam-bearing). *fl.* whitish, small, in panicled racemes. *l.* impari-pinnate, with stalked, quite entire, coriaceous leaflets. *h.* 60ft. West Indies, 1820.

HEDYCHIUM (from *hedys*, sweet, and *chion*, snow; referring to the sweet-scented snow-white flowers of *H. coronarium*, which was the first species introduced). Indian Garland Flower. ORD. *Scitamineæ.* A genus of about twenty-five species of handsome stove herbaceous plants, all natives of tropical Asia. They have terminal spikes of white, scarlet, or yellow flowers, and fine foliage. Some of the species, particularly *H. Gardnerianum*, thrive well planted out in a wide conservatory border, in a compost of good loam enriched with a little thoroughly decayed manure, and the whole rendered porous by the addition of some sharp sand. Hedychiums are exceedingly ornamental.

Hedychium—*continued.*

Occasional supplies of liquid manure are beneficial in securing strength and vigour. These plants are also valuable for sub-tropical gardening, and for this purpose may be treated similar to **Canna** (which *see*). For pot culture, they may be placed in large pots or tubs, in spring, using rich soil, and applying plenty of water and liquid manure when established. When flowering is over, the spikes may be cut down. In spring, when the plants are repotted, the rhizomes can be divided. The second season, the spent earth can be partly removed, and the plants repotted into pots or boxes only an inch or two larger. Where a heated tank is used for growing tropical water plants, place the bottom of the pots or tubs, containing the Hedychiums, in the water to a depth of 2in. or 3in.; where such a convenience does not exist, water the plants two or three times daily during the season of growth. Of those now in cultivation, *H. Gardnerianum* is by far the commonest; and, with the exception of that species, and of *H. flavum*, the ones mentioned below are stove plants.

H. acuminatum (taper-pointed). *fl.* handsome, fragrant; spike loose, 9in. or more long; two outer segments of corolla limb linear, patent; of the three inner, two are pale yellow, the third pure white; lamina deeply cut into two segments; filaments red. October. *l.* broadly lanceolate, with an almost filiform point, glabrous above, slightly silky beneath. *h.* 3ft. to 5ft. East Indies, 1820. (B. M. 2969.)

H. angustifolium (narrow-leaved). *fl.* dull red, small, generally four to a fascicle, expanding in succession; corolla tube slender, cylindric, about 1in. long; calyx same length, superior, cylindric; spikes terminal, erect, rigid, open, 6in. to 18in. long, smooth. June. *l.* linear-lanceolate, 10in. to 14in. long, 1in. to 2in. broad, bifarious, sessile on their smooth sheaths, pointed, smooth on both sides. Stems erect, 3ft. to 6ft. high. India, 1815. (B. M. 2078.)

H. carneum (flesh-coloured). *fl.* flesh-coloured, scentless; bracts ciliated, one-flowered, convolute; calyx sub-tomentose. August. *l.* bifarious, over 1ft. long, very slender, acuminate. *h.* 3ft. to 4ft. East Indies, 1823. (B. M. 2637.)

H. chrysoleucum (gold and white). *fl.* pure white, with a bright orange-coloured blotch on the lip, very fragrant; filaments long, very deep orange. August. *h.* 5ft. East Indies. (B. M. 4516.)

H. coronarium (garland).* *fl.* snow-white, sweet-scented; lip nearly 2in. wide. May. *h.* 5ft. East Indies, 1791. (B. M. 708.)

H. flavosum (yellow). *fl.* yellow, numerous, fragrant; corolla tube slender; laciniæ linear; lip erect, large, obcordate; spike terminal, solitary, erect, 6in. to 8in. long. July. *l.* lanceolate, very fine-pointed, pubescent and pale beneath; sheaths slightly pubescent. *h.* 2ft. to 3ft. Silhet, Bengal. (B. M. 2378, under name of *H. flavum.*)

H. flavum (yellow).* *fl.* bright orange, large, fragrant. July. *l.* 12in. to 14in. long. *h.* 3ft. Nepaul, 1822. In many Cornish gardens, this handsome species has proved nearly hardy. (B. M. 2039.)

FIG. 193. HEDYCHIUM GARDNERIANUM, showing Habit and detached Flower-spike.

H. Gardnerianum (Gardner's).* *fl.* lemon-coloured, large, fragrant. Summer. *l.* broadly lanceolate, stem-clasping, in two rows. *h.* 3ft. to 5ft. East Indies, 1819. This very fine species is nearly hardy in England, if provided with a slight winter protection. The crowns, may, however, be lifted and stored similar to those of the Dahlia or Canna. See Fig. 193. (B. R. 774.).

H. gracile (slender). *fl.* white, with the filament red; calyx tubular, membranous; corolla tube ⅔in. to ¾in. long; lobes three, filiform; staminodes linear, acute; lip linear-oblong, two-lobed; spike 5in. to 7in. long. September. *l.* 5in. to 9in. long, 2in. to 3in. broad, finely acuminate; base acute, narrowed into a petiole ½in. to ¾in. broad. *h.* 2ft. to 3ft. Sikkim-Himalaya and Khasia Mountains, 1820. (B. M. 6638.)

H. spicatum (spike-flowered). *fl.* yellowish; corolla-tube extending 1in. beyond the sheath; lip two-lobed, emarginate. October. *l.*, spathe erect, one-flowered, two-valved. *h.* 3ft. India, 1810. (B. M. 2300.)

HEDYOTIS CAMPANULIFLORA. *See* **Coccocypselum campanuliflorum.**

HEDYSARUM (*Hedysaron*, the Greek name used by Dioscorides). ORD. *Leguminosæ.* This genus includes about fifty species of elegant hardy perennial herbs or subshrubs, which are distributed throughout Europe, North Africa, and the temperate and mountainous parts of Asia, two species being North American. Flowers purple, white, yellowish-white, or rarely yellow; peduncles bearing racemose spikes of large flowers. Leaves imparipinnate; leaflets entire, often pellucid-dotted, exstipellate. Very few species are grown in our gardens, with the single exception of *H. coronarium.* They are all of very easy culture in ordinary gardens, but open, sunny spots, and good deep soil, are most calculated to insure success. Increased by seeds.

H. coronarium (garland).* French Honeysuckle. *fl.* deep red; spikes or racemes ovate, crowded. Summer. *l.* with three to five pairs of elliptic or roundish leaflets, which are clothed with pubescence beneath and on the margins. Stems diffuse. *h.* 3ft. to 4ft. South-west Europe, 1596. Perennial herb. There is also a white-flowered variety. *H. flexuosum*, a closely allied species, from Southern Spain, has red flowers, tinged with blue.

H. Mackenzii (Mackenzie's). *fl.* red, large, disposed in long racemes. Summer. *l.*, leaflets oblong, clothed on both surfaces with hoary pubescence. North America, 1878. Plant decumbent. Perennial herb. (B. M. 6386.)

H. obscurum (obscure). *fl.* purple, in long spikes. Summer. *l.* with five to nine pairs of ovate-glabrous leaflets. Stems erect. *h.* 6in. Europe, 1640. Perennial herb. (B. M. 282.)

H. sibiricum (Siberian). *fl.* purple; racemes long, axillary; bracts shorter than the peduncles. June and July. *l.* pinnate, ovate-lanceolate, smooth. *h.* 4ft. Siberia, 1798. Perennial herb. (B. M. 2213; B. R. 808, under name of *H. alpinum.*)

FIG. 194. HEDYSCEPE CANTERBURYANA.

HEDYSCEPE (from *hedys*, sweet, and *skepe*, a covering). ORD. *Palmæ.* A monotypic genus, the species being a tall stove palm. For culture, *see* **Kentia.**

H. Canterburyana (Viscount Canterbury's).* *fl.*, panicle branching into spreading spikes of about 6in., the rachis thick and flexuose, the notches not immersed and not close; male perianth, outer segments narrow-lanceolate, about two lines, the inner ones broader and striate; female perianth, outer segments three lines broad, and almost as long, inner ones ovate and rather shorter. *fr.* ellipsoid, the pericarp hard when dry. *l.* long, pinnate, in a dense head; segments numerous, nearly equal, and acuminate. *h.* 32ft. Lord Howe's Island. SYN. *Kentia Canterburyana.* See Fig. 194.

HEEL. The base of a young cutting, when removed from the junction formed by its connection with the parent plant. Many cuttings, especially those of a hard-wooded nature, root better when inserted with Heels, that part of the wood being just sufficiently solidified; and, if removed from the side of a branch, a larger surface is secured for placing in contact with soil than when a horizontal cut is made.

HEELING-IN. The temporary insertion of cuttings, or the roots of plants, in soil, to preserve them until their permanent quarters are prepared. Heeling-in also applies to crops that are lifted, and their roots temporarily covered with soil in a cool situation, to prolong the season of supply.

HEERIA (named in honour of Oswald Heer, a celebrated Swiss botanist of the present century). SYNS. *Heterocentron, Schizocentron.* ORD. *Melastomaceæ.* A genus comprising about four species of erect or prostrate, pilose or glabrous herbs and sub-shrubs, inhabiting the mountains of Mexico and Guatemala. Flowers white or pink; petals four, ovate or obovate, obtuse or acuminate. Leaves cordate, lanceolate, or obovate-lanceolate, membranaceous. *H. rosea*, the only species yet introduced, is a very rare but ornamental stove evergreen shrub, which can be grown out of doors, in warm localities, during part of the summer. It is a valuable stove winter-flowering plant, and succeeds best in sandy loam and peat. Cuttings of young shoots may be struck in February and March.

H. rosea (rosy). *fl.*, panicle compound, terminal, spreading, composed of the numerous flowering branches, each of which forms a corymb of many bright rose-coloured flowers, nearly 1in. in diameter; petals four, spreading, rhomboid-orbicular, a little concave, shortly unguiculate. Autumn and early winter. *l.* opposite, slightly scabrous above, elliptical, obtuse, entire, penninerved, tapering at the base into a moderately long petiole. *h.* 1ft. or more. Mexico. Plant suffruticose. (B. M. 5166, under name of *Heterocentrum mexicanum.*)

HEIMIA. This genus is now included under **Nesæa** (which *see*).

HEINSIA (named after the celebrated philologist, Heinsius, who translated the writings of Theophrastus). ORD. *Rubiaceæ.* A genus including three or four species of evergreen shrubs, natives of tropical Africa. Flowers white, largish, pedicellate, solitary, or disposed in three to six-flowered terminal cymes. Leaves opposite, shortly petiolate, oblong or elliptic-lanceolate, acuminate. *H. jasminiflora*, the only species yet introduced, is a beautiful, much-branched, unarmed, glabrous, stove shrub. For culture, *see* **Gardenia.**

H. jasminiflora (Jasmine-flowered).* *fl.* white, salver-shaped, numerous, three or four together at the tops of the branchlets, pedicellate, somewhat racemose. February. *l.* opposite, oval-oblong or ovate, acuminated, on short petioles. *h.* 5ft. to 8ft. Sierra Leone, 1824. (B. M. 4207.)

HEINTZIA. This genus is now included under *Alloplectus.*

HEISTERIA (named after Laurence Heister, 1683-1758, Professor of Botany at Helmstadt). Partridge Pea; Pois-Perdrix. SYN. *Hesioda.* ORD. *Olacineæ.* This genus comprises about ten species of glabrous trees or shrubs, one from Western tropical Africa and the rest from tropical America. Flowers small, sessile or pedicellate, in the axils of the leaves. Leaves entire, coriaceous. Probably the only species yet introduced is the one described below. It is a stove evergreen tree, thriving in a compost of loam, sand, and peat. Firm cuttings will root in sand, in brisk bottom heat.

H. coccinea (scarlet). *fl.* white, small, twin or numerous, axillary; calyx dark purple or scarlet. Winter. *l.* alternate, entire, lanceolate, rounded at the base. *h.* 15ft. West Indies, 1822.

HELCIA. Included under **Trichopilia** (which *see*).

HELENIUM (*Helenion*, an old Greek name used by Hippocrates, and probably derived from Helen of Troy). ORD. *Compositæ.* A genus containing about eighteen species of ornamental hardy herbaceous annuals or perennials, inhabiting Central and North America. Receptacle chaffy, between the ray-florets only; pappus of five bristles; involucral bracts in one series, united at the base; ray-florets toothed at the apex. Leaves alternate, often decurrent, entire or few-toothed. The species are more or less strong-growing, and are, consequently, best suited for the margins of shrubberies or the back of herbaceous borders. In such situations, they may be extensively grown, and the abundance of flowers which they produce will prove valuable for decorative purposes. Propagated by divisions, or by seed.

H. autumnale (autumnal).* *fl.-heads* pure yellow, large, with long four to five-cut ray-florets. Autumn. *l.* smooth, lanceolate, 3in. to 4in. long, ½in. broad, acute at both ends. Stem branching at top. *h.* 4ft. to 6ft. North America, 1729. Perennial. A very showy and elegant species. (B. M. 2994.)

H. Hoopesii (Hoopes's). *fl.-heads* bright orange, about 2in. across; involucral segments long, narrow, acuminated. Summer. *l.* lanceolate, acuminated, smooth, stem-clasping. Stem simple. *h.* 2½ft. North America. Perennial.

H. nudiflorum (naked-flowered). *fl.-heads* pure yellow, loosely disposed, medium-sized, fragrant. Summer and autumn. *l.* alternate, linear-lanceolate. *h.* 2ft. to 3½ft. South United States. Perennial. *H. n. atropurpureum* (dark purple) is a variety with purple ray-florets.

H. quadridentatum (four-toothed). *fl.-heads* yellow; disk-florets four-toothed. May to October. *l.*, lower ones pinnatifid; upper entire, smooth. Louisiana, 1790. Annual or biennial. (B. R. 598.)

HELIAMPHORA (from *helios*, the sun, and *amphora*, a pitcher; in reference to the circular ascidia). ORD. *Sarraceniaceæ.* A monotypic genus. The species is a greenhouse herbaceous perennial. Probably this plant only yet exists in a single establishment in this country. Most likely it requires similar treatment to **Sarracenia** (which *see*).

H. nutans (nodding). *fl.* white, or pale rose-coloured, nodding, on an erect, few-flowered scape; sepals five, rarely four, spreading. *l.* radical, tubular, in the form of a pitcher with an oblique mouth, lined with deflexed hairs. *h.* 1ft. to 2ft. Roraima, 1883. (T. L. S. xviii. 29.)

HELIANTHEMUM (from *helios*, the sun, and *anthemon*, a flower). Sun Rose. Including *Fumana.* ORD. *Cistineæ.* A genus of showy, hardy, annual or perennial herbs or sub-shrubs, often prostrate. Nearly 150 forms have been described as species; but, according to Bentham and Hooker, only about thirty are entitled to specific rank. They are natives of North, Central, and South America, and the Mediterranean region; a few extend to other parts of Europe and Western Asia, four species being members of the British Flora. Racemes secund, sometimes corymbose, sometimes paniculate; and before the flowers expand, the racemes at the top are bent or twisted backwards, becoming gradually erect as the flowers open. Leaves opposite and alternate. All the species are of easy culture in a sandy-loam soil, and are best adapted for banks and rockwork. The annual species must be raised from seed. The perennials may be similarly increased; but it is better to trust to cuttings, which root readily in a sandy soil, if kept shaded until established. The following is a selection of the more important species and varieties.

Helianthemum—*continued.*

H. atriplicifolium (Atriplex-leaved). *fl.*, petals yellow, large; peduncles racemose, hairy. June. *l.* stalked, broad-ovate, bluntish, waved at the base, tomentose on both surfaces. Branches white from tomentum. *h.* 4ft. Spain, 1659. Shrub.

H. canadense (Canadian). *fl.* pale yellow, minute, crowded; peduncles very short, one to three-flowered. Summer. *l.* oblong-linear; margins usually revolute; under surface tomentose. Branches very erect, pubescent. *h.* 1ft. North America, 1823. Herbaceous. (S. C. 21.)

H. carolinianum (Carolina). *fl.* yellow, 1in. across. May and June. *l.* shortly stalked, lanceolate, denticulate, hairy. Base shrubby. *h.* 6in. to 12in. South United States. (S. C. 99.)

H. formosum (showy). *fl.*, petals yellow, marked with a black spot at the base of each, large; peduncles villous. Summer. *l.* shortly stalked, obovate-lanceolate, tomentosely-villous; younger ones hoary. Branches canescent. *h.* 4ft. Portugal, 1780. Shrub. (B. M. 264; Gn. xxvi., 420, under name of *Cistus formosus.*)

H. Fumana (smoky). *fl.* bright yellow. June. *l.* linear, fleshy, thinly hairy. South-western Europe. An elegant sub-shrub, of Heath-like habit. (S. C. 16.)

H. globulariæfolium (Globularia-leaved). *fl.* citron-yellow, black-spotted, in dense racemes. Summer. *l.*, radical ones long-stalked, ovate-oblong, hairy, upper surface furrowed; cauline ones sessile, lanceolate. Stems ascending, almost simple, herbaceous. *h.* 9in. Spain and Portugal, 1752. (B. M. 4873, under name of *H. Tuberaria.*)

FIG. 195. FLOWERING BRANCH OF HELIANTHEMUM GUTTATUM.

H. guttatum (spotted). *fl.* yellow, with red spot at the base of each petal, in unilateral cymes. Summer. *l.* opposite, sessile, oblong-linear, hairy. *h.* 6in. Europe (Britain), North Africa, and West Asia. Annual. See Fig. 195.

H. halimifolium (Halimus-leaved). *fl.* bright yellow, large, slightly spotted at the base of each petal. Summer. *l.* ovate-lanceolate, acute, wavy, pubescent. *h.* 3ft. to 4ft. Spain. Shrub. (S. C. 4.)

H. italicum (Italian). *fl.* yellow, small; racemes simple, hispid. Summer. *l.*, lower ones stalked, ovate; upper ones linear-oblong, almost sessile. Branches procumbent, long, hispid, shrubby. *h.* 3in. Europe, 1817.

H. lævipes (smooth-stalked). *fl.* yellow. Summer. *l.* linear, needle-like. *h.* 1ft. South-western Europe. A beautiful little shrub, requiring shelter during severe weather. (B. M. 1782, under name of *Cistus lævipes.*)

H. lavandulæfolium (Lavender-leaved). *fl.* yellow; racemes crowded. Summer. *l.* oblong-linear, with revolute margins; under surface tomentose, hoary. Stem shrubby, erect, branched; branches long, terete, canescent. *h.* 1ft. Mediterranean region, 1817.

H. ocymoides (Ocymum-like). *fl.*, petals yellow, with a dark base, crenated; peduncles somewhat panicled, pilose. Summer. *l.* sessile, ovate-lanceolate, obtuse. Stem branched; branches, leaves, peduncles, and sepals beset with long loose hairs. *h.* 1ft. to 3ft. South-western Europe, 1800. Sub-shrub. (B. M. 5621.) *H. algarvense* (S. C. 40), *H. candidum* (S. C. 25), *H. rugosum* (S. C. 65), represent forms of this variable species.

H. polifolium (Polium-leaved). *fl.* white, marked yellow at the base; petals crenulated; racemes terminal, secund. Summer. *l.* oblong-linear, with revolute margins, tomentose on both surfaces. Stem shrubby, branched; branches procumbent, densely tomentose. Europe (Britain), North Africa. SYN. *H. pulverulentum.* (S. C. 88.) *H. roseum* is a beautiful variety, with rosy-red flowers. (S. C. 55.)

H. pulverulentum (powdery). A synonym of *H. polifolium.*

H. scoparium (broom). *fl.* yellow, small, by twos or threes at ends of branches, on naked pedicels; sepals five, three of which are oval and pointed, and two subulate; corolla twice as long as calyx. May and June. *l.* alternate, linear, without stipules. *h.* 3in. California, 1848. Perennial.

H. serpyllifolium (Thyme-leaved). A synonym of *H. vulgare ovalifolium.*

H. umbellatum (umbellate). *fl.* pure white, in a whorled raceme, ending in an umbel. June. *l.* linear-oblong, with revolute margins, ciliate, viscid when young. *h.* 9in. to 18in. Perennial. (S. C. 5.)

H. vineale (vineyard). *fl.* yellow; racemes simple. Summer. *l.* variable, obovate, ovate, or elliptical, pilose. Stem suffruticose, procumbent, branched, ascending, tomentose, evergreen. Europe, 1772.

H. vulgare (common). *fl.* yellow; racemes loose; pedicels pilose. Spring and summer. *l.* scarcely revolute at the margins; under surface hoary; upper surface green, pilose. Stem shrubby, procumbent. Branches elongated. Europe (Britain), North Africa, and West Asia. (Sy. En. B. 168.) A curious variety, or (according to Bentham) an accidental deformity, occasionally seen in gardens, and supposed to have been originally found near Croydon, with small, narrow, deeply cut petals, has been figured under the name of *H. surrejanum.* The Rock-roses of our gardens are chiefly varieties of this species, which, under cultivation, varies much in the colour of its flowers. The following are amongst the most distinct of the innumerable forms:

H. v. barbatum (bearded). *l.* ovate or elliptic-lanceolate, clothed with long white hairs. (S. C. 73.)

H. v. hyssopifolium (Hyssop-leaved). *fl.* coppery-red (S. C 58) or saffron-coloured (S. C. 92). *l.* flat, linear-lanceolate or lanceolate; upper surface glossy. Of the one with coppery-red flowers, there is a double form.

H. v. macranthum (large-flowered). *fl.* whitish, yellow at the base; racemes terminal, secund, simple. Summer. *l.* flat, ovate-oblong, acutish, densely tomentose beneath, smooth above. Branches shrubby, procumbent, rather tomentose.

H. v. mutabile (changeable). *fl.* pale rose-colour, yellow at base, becoming almost white before petals fall. Summer. (S. C. 106.)

H. v. ovalifolium (oval-leaved). *fl.* yellow. *l.*, lower ones roundish or oval, glossy green above, white beneath; margins more or less revolute. SYN. *H. serpyllifolium.* (S. C. 60.)

FIG. 196. FLOWER-HEAD OF HELIANTHUS ANNUUS GLOBOSUS FISTULOSUS.

HELIANTHUS (from *helios*, the sun, and *anthos*, a flower). Sunflower. Including *Harpalium.* ORD.

Helianthus—*continued.*

FIG. 197. HELIANTHUS ANNUUS CALIFORNICUS PLENISSIMUS, showing Habit and detached Single Flower-head.

Compositæ. A genus containing about fifty species of tall, hardy, annual or perennial herbs, natives, for the most part, of North America; a few, however, are found in Peru and Chili. Flower-heads very large; ray-florets

FIG. 198. FLOWERING BRANCH OF HELIANTHUS ARGOPHYLLUS.

Helianthus—*continued.*

yellow; disk-florets purple or violet. Leaves large, simple, scabrid. All the species are of easy culture in almost any moderately good garden soil. The taller-growing ones are best adapted for growing in a shrubbery, or in the back rows of herbaceous borders, where they will require plenty of space to fully develop. Propagated by divisions; or by seeds, sown either in pots, and the seedlings afterwards transplanted, or in the open ground, about March.

H. angustifolius (narrow-leaved). *fl.-heads* about 1½in. across, numerously disposed in a long, leafy raceme. September and October. *l.* dark green, narrow, tufted, glossy. Stems slender. *h.* 2½ft. Perennial.

H. annuus (annual).* Common Sunflower. *fl.-heads* very large, varying in size and colour. Summer. *h.* 6ft. Western United States, 1596. (B. M. 2051.) Of the many varieties of this annual species, the finest is *globosus fistulosus* (see Fig. 196), the flowers of which are very large, and of a splendid, extremely double, globular form, when fully developed. It is best grown in a rich, deep soil. Other forms are: *californicus plenissimus* (see Fig. 197), *cucumerifolius*, *giganteus*, and *grandiflorus*.

H. a. macrocarpus (large-fruited). A cultivated race, with larger and lighter-coloured achenes, long cultivated in Russia, &c., for food and oil.

H. argophyllus (silver-leaved). *fl.-heads* yellow. Autumn. *l.* clothed with a soft, silky, silvery down. *h.* 6ft. Texas. This species is closely allied to *H. annuus*, into which it appears to degenerate under cultivation. Annual. See Fig. 198.

H. atrorubens (dark-red). *fl.-heads* scattered; disk dark red or purple; rays yellow, acuminated, entire. *l.*, radical ones flat, hairy; upper ones twisted and waved, hairy, tuberculated. Stems purple, rough, with whitish hairs. *h.* 2ft. to 3ft. United States, 1732. Perennial.

H. decapetalus (ten-petaled). *fl.-heads* about 2in. across, terminal, solitary, on slender, twiggy branchlets. Autumn. *l.*, lower ones somewhat ovate-acuminate, hardly 6in. long; upper ones 2in. to 3in. long; all somewhat obscurely serrate. *h.* 5ft. Perennial. (B. M. 3510.)

FIG. 199. FLOWERING BRANCH OF HELIANTHUS DECAPETALUS MULTIFLORUS.

H. d. multiflorus (many-flowered).* This is a very old garden plant, only known in cultivation. It has firmer leaves, larger heads, and more numerous bracts than *decapetalus*. See Fig. 199.

Helianthus—*continued.*

(B. M. 227, under name of *H. multiflorus.*) The common form is of dwarf habit, with double flowers.

H. d. multiflorus major only differs from ordinary *multiflorus* in its larger flower-heads.

H. diffusus (diffuse). A synonym of *H. rigidus.*

H. lenticularis (lenticular). *fl.-heads* yellow, large, drooping; scale of involucre expanded, scabrous on the back. August. *l.* alternate, petiolate, ovate, three-nerved, serrate. Stem hispid. *h.* 6ft. North America, 1827. (B. R. 1265.) This is a variety of the Common Sunflower, *H. annuus.*

H. mollis (soft). *fl.-heads* yellow. July to October. *l.* ovate, acuminate, three-nerved, closely-serrated, scabrous above, hoary and soft beneath. *h.* 4ft. North America, 1805. (B. M. 3689.)

FIG. 200. UPPER PORTION OF STEMS, AND DETACHED FLOWER-HEAD, OF HELIANTHUS ORGYALIS.

H. orgyalis (nocturnal).* *fl.-heads* yellow, comparatively small, numerous, forming a large panicle. Autumn. *l.* alternate, numerous, very narrow and recurved, 5in. to 8in. long, ½in. to 1in. wide. *h.* 6ft. to 10ft. United States, 1879. Very graceful, and one of the best and most useful decorative autumnal-flowering plants. Perennial. See Fig. 200.

H. pubescens (downy). *See* **Wyethia angustifolia.**

H. rigidus (rigid).* *fl.-heads* glistening golden-yellow, about 4in. across, formed of a deep ray and small disk; ray-florets 1½in. long, ½in. broad, tips incurved, and edges reflexed; disk-florets chocolate colour; involucre scaly; peduncles long, hairy. August. *l.*, stem ones very hispid, lanceolate, slightly dentate; radical ones few, oval, 5in. or 6in. long. *h.* 3ft. North America. Perennial. SYN. *H. diffusus.* (B. M. 2020.)

H. tuberosus (tuberous). Jerusalem Artichoke. *fl.-heads* yellow. September and October. *l.* three-nerved, scabrous; lower cordate-ovate, upper ovate-acuminate, alternate; petioles ciliated at base. Roots creeping, and towards the end of autumn produce a number of round, irregular, reddish or yellow tubers, clustered together, and of about the size of an ordinary potato. *h.* 6ft. to 8ft. Upper Canada and United States, 1617. This was cultivated by the aborigines, and the tubers developed. It is certainly not South American, as stated in so many books. The common name of this species is supposed to be a corruption of the Italian *Girasole articocco*, or Sunflower Artichoke. For culture, *see* **Artichoke, Jerusalem.**

HELICHROA. *See* **Rudbeckia.**

HELICHRYSUM (an old Greek name used by Theophrastus; the latter part of the word, from *chrysos*, gold, refers to the colour of the flowers). Everlastings. SYN. *Elichrysum.* ORD. *Compositæ.* A genus comprising 260 species of greenhouse or hardy, herbaceous or shrubby plants, natives, for the most part, of the Cape of Good Hope. Flower-heads large, solitary; involucral bracts scarious, not silvery, spreading or recurved, or clustered and small with incurved bracts; pappus rough or sub-

Helichrysum—*continued.*

plumose. Very few species are grown in our gardens. Helichrysums succeed best in a rich loamy soil, either when grown in pots or planted out. The annual species, and the varieties (of which there are a good number) of *H. bracteatum*, may be readily raised from seed, sown in a light heat, in March, and afterwards transplanted, or in the open ground at the latter end of that month. The greenhouse and half-hardy perennial species may be propagated by cuttings, inserted in spring, in a close frame, without much heat. Flowers that are intended for drying should be gathered when partially unfolded, and suspended with their heads downward in a cool shed. Any that are required to ripen seed must be allowed to remain on the plants until naturally developed.

H. apiculatum (small-pointed). *fl.-heads* yellow, in small clustered corymbs. *h.* 1½ft. Australia, 1804. Plant covered with a silvery tomentum. Half-hardy perennial.

H. arenarium (sand-loving).* Yellow Everlasting. *fl.-heads* bright golden-yellow, disposed in a compound corymb. Summer. *l.* lanceolate, entire, stem-clasping, blunt and recurved at tips, with revolute edges; downy white on both surfaces. Stem upright, simple, downy. *h.* 6in. to 12in. Europe, 1739. Hardy herbaceous. The flowers of this species are very extensively used for decorative purposes, and are popularly known as Immortelles. They are also largely employed in the making of funeral wreaths, crosses, &c.

FIG. 201. FLOWERING BRANCH OF HELICHRYSUM BRACTEATUM.

H. bracteatum (bracteate).* *fl.-heads* very various, solitary, terminal. August. *l.* lanceolate, entire. *h.* 3ft. to 4ft. Australia, 1799. Half-hardy annual. See Fig. 201. *H. acuminatum, H. chrysanthum*, and *H. macrocephalum*, are mere forms of this species.

H. b. aureum (golden). *fl-heads* golden-yellow. See Fig. 202.

H. b. bicolor (two-coloured). *fl.-heads* yellow. August. *l.* linear-lanceolate, acuminate, obtuse at the base, roughly ciliated; upper ones subulate. 1835. (B. R. 1814.)

H. b. compositum (compound) is a fine "double" strain, with various-coloured flower-heads. See Fig. 203.

H. b. macranthum (large-flowered). *fl.-heads* white, rose coloured outside. (B. R. 1838, 58.)

H. b. niveum (snowy).* *fl.-heads* white, yellow, large, solitary, terminal; scales of involucre white, conniving, ovate, mucronate. June. 1838. (B. M. 3857.)

Helichrysum—*continued.*

H. buphthalmoides (Buphthalmum-like). A synonym of *H. scorpioides.*

FIG. 202. HELICHRYSUM BRACTEATUM AUREUM, showing Habit and detached Flower-head.

FIG. 203. FLOWER-HEADS OF HELICHRYSUM BRACTEATUM COMPOSITUM.

H. ericæfolium (Heath-leaved). *fl.-heads,* outer involucre rough; inner flesh-coloured. March to August. *l.* sessile, linear. *h.* 1½ft. Cape of Good Hope, 1774. Greenhouse shrub. (B. M. 435, under name of *Gnaphalium ericoides.*)

FIG. 204. HELICHRYSUM FŒTIDUM, showing Habit and detached Single Flower-head.

H. felinum (feline). *fl.-heads* purple. May and June. *l.* lanceolate, sessile, three-nerved, naked above, woolly beneath. *h.* 3ft. Cape of Good Hope, 1791. Greenhouse shrub. (B. R. 243, under name of *Gnaphalium congestum.*)

H. fœtidum (fœtid). *fl.-heads* light yellow. June to September. *l.* amplexicaul, entire, acute, downy beneath. Stem branched. *h.* 2ft. Cape of Good Hope, 1692. Greenhouse herb. See Fig. 204. (B. M. 1987, under name of *Gnaphalium fœtidum.*)

H. frigidum (frigid). *fl.-heads* silvery white, about ½in. in diameter. May. *l.* small, silky-hairy. *h.* 3in. Corsica, 1879. Plant elegant with decumbent branches. Half-hardy. (B. M. 6515.)

H. grandiflorum (large-flowered). *fl.-heads* white; corymb stalked; involucre cylindrical. June to August. *l.* amplexicaul, ovate-oblong, three-nerved, woolly above. *h.* 3ft. Cape of Good Hope, 1731. Greenhouse sub-shrub. (A. B. R. 489, under name of *Gnaphalium grandiflorum.*)

H. graveolens (strong-scented). *fl.-heads* yellow, small, disposed in clusters. *l.* linear, sessile. Tauria, 1877. Plant woolly, half-hardy, herbaceous. (R. G. 889.)

H. Gunnii (Gunn's). A synonym of *H. scorpioides.*

H. Mannii (Mann's). *fl.* globose, 1in. across, numerous, disposed in a large convex umbel, 6in. to 8in. across, at the summit of the stem; involucre white, of numerous closely imbricated scales; disk-florets innumerable, bright yellow; pappus hairs slightly thickened upwards. September. *l.* close placed, spreading, lanceolate, acuminate, slightly tortuose. Stem brown, woody, naked below, becoming gradually herbaceous, and clothed with leaves upwards. *h.* 2ft. or more (in cultivation). Fernando Po and Cameroons, 1863. Greenhouse shrub. (B. M. 5431.)

H. plicatum (folded). *fl.-heads* white, corymbose, large. *l.* narrow, tapering into a long stalk. Macedonia, 1877. Plant woolly, forming prostrate, spreading, greyish tufts. An excellent hardy herbaceous plant for clothing dry, stony banks. (R. G. 889.)

H. scorpioides (scorpion-like). *fl.-heads,* involucre broadly hemispherical; bracts very numerous, the outer ones short, often tinged with brown, passing into the intermediate ones, of a bright yellow, usually narrow. *l.* from oblong-spathulate to linear, mostly acute, glabrous or scabrous above, loosely woolly underneath, the upper ones few and small. Stem ascending or erect, usually simple, often exceeding 1ft., and rather weak. Australia, 1838. Greenhouse herbaceous perennial. SYNS. *H. buphthalmoides, H. Gunnii.*

H. Stœchas. Goldy-locks. *fl.-heads* yellow, corymbose, crowded, shortly stalked. Summer. *l.* sessile, linear, obtuse, silvery underneath. Stems branching, spreading, covered with silvery down. *h.* 1ft. South Europe, 1629. Hardy evergreen sub-shrub.

HELICODEA ZEBRINA. A synonym of **Billbergia zebrina** (which *see*).

HELICODICEROS (from *helix, helikos,* spiral, *dis,* twice, and *keras,* a horn; in allusion to the basal divisions of the leaf twisting and standing erect, and thus somewhat resembling horns). ORD. *Aroideæ* (*Araceæ*). A hardy tuberous perennial herb, allied to *Arum.* It requires the protection of a frame in severe weather. For culture, *see* **Arum.**

H. crinitus (hairy-spathed).* *fl.* dark purple-brown; spadix cylindrical, shorter than the ovate, flat, brown spathe, which is hairy inside. April. *l.* pedate; lobes entire. *h.* 1ft. to 1½ft. Corsica, 1777. SYN. *Arum crinitum.* See Fig. 205.

HELICOID. Twisted, like a snail's shell.

HELICONIA (from *Helicon,* a mountain in Greece, consecrated to the Muses). ORD. *Scitamineæ.* A genus allied to *Musa,* containing about twenty-five species, all of which are natives of the tropical regions of the Western hemisphere. They are ornamental, but rarely-grown, stove herbaceous perennials, with inconspicuous flowers, borne on short spathes, and handsome foliage. Heliconias may be propagated from seed, but the best method is by division of the root-stock when growth commences in spring. Separate pieces may be inserted in 5in. pots, and grown on rapidly in a moist stove temperature, repotting into larger sizes as becomes requisite; or they may be planted out in the stove, if desired. A rich, loamy, open soil is best, and plenty of water should be applied during the growing season, withholding it when the plants die down, in winter. Shade must be given in summer, to prevent the sun injuring the foliage.

H. aureo-striata (golden-striped).* *l.* deep green, with the course of the parallel-curved veins from the costa to the margin traced out by yellow lines; elongate-ovate, cordate at the base. Stems striated with green and yellow. 1881. A noble plant. (I. H. n. s. 464.)

Heliconia—*continued.*

FIG. 205. HELICODICEROS CRINITUS, showing Habit and Young Unopened Spathe.

FIG. 206. HELICONIA BICOLOR, showing Habit and separate Inflorescence.

H. bicolor (two-coloured). *fl.* white, tipped with greenish; ovaries and spathes scarlet. *l.* long-stalked, gracefully arching. Brazil. See Fig. 206. (R. G. 172.)

Heliconia—*continued.*

H. Bihai (Bihai).* *fl.* red or orange-colour. July and August. *l.* on long petioles, ovate-lanceolate, some of which are slightly curved towards the edges. *h.* 12ft. West Indies, 1786. A handsome and graceful foliage plant. See Fig. 207. (B. R. 374.)

H. brevispatha (short-spathed). *fl.* white; spike short, of not more than four or five orange-red spathes, of which the inferior one is flowerless; the rest are much smaller and gradually shorter upwards. Summer. *l.* oblong, rather obtuse at the base, much acuminated at the apex, quite glabrous; petioles short. *h.* 3ft. South America, 1861. A very singular plant. (B. M. 5416.)

H. humilis (humble). *fl.* whitish-green, sessile; spathes five to seven, broadly boat-shaped, many-flowered, scarlet. *l.* oblong, acute at both ends; petioles long, exceeding the scape. Guiana, 1867. (B. M. 5613.)

H. metallica (metallic). *l.* elegantly drooping and recurved, broadly lanceolate; central rib, margins, and curving veins of a dark bronzy-red, which is also the colour of the under surface; petioles distichous, bronzy-red. New Grenada, 1862. (B. M. 5315.)

H. psittacorum (parrot-beaked).* *fl.* orange, in clusters upon short peduncles, within a lanceolate spathe. August. *l.* smooth, shining, alternate, lanceolate-elliptic, acuminate, many-nerved; footstalks membranous, sheathing the stem. Stem polished, straight, round; upper part naked; lower part clothed with leaves. *h.* 8ft. (in cultivation, 3ft). Jamaica, 1797. A beautiful plant. (B. M. 502.)

H. triumphans (triumphant).* *l.* oblong-acute, dark green, picked out with narrow blackish stripes running from the midrib to the margin at distant intervals. Introduced to Europe from Sumatra, in 1883 (but probably of New World origin). (G. C. n. s., xix., p. 565.)

Heliconia—*continued.*

FIG. 207. HELICONIA BIHAI.

H. vinosa (wine-red). *l.* large, broadly oblong, 1½ft. long, acuminated, bright green above, purplish beneath; upper surface transversely plicate or ridged. Stem slender, greenish. Columbia, 1871.

HELICTERES (from *helikter*, a twisted bracelet; so called from the screw-shaped carpels). ORD. *Sterculiaceæ.* A genus comprising about thirty species of pubescent or tomentose, stellate or branched, stove trees or shrubs, distributed over the warmer regions of both hemispheres, the majority being American. Flowers axillary, solitary or fasciculate. Capsules often stellato-tomentose. Leaves entire or serrate. The undermentioned is the species best known to cultivation in this country. Helicteres thrive in a mixture of loam and peat. Propagated by cuttings, taken off at a joint, and inserted in sand, under a glass, in heat.

H. Isora (Isora). *fl.* orange-red, axillary. September. *l.* much resembling, in form and substance, those of the Hazel Nut; when young, tomentose on both sides; the old leaves lose their pubescence on the upper surface. *h.* 6ft. India, Australia, &c. (B. M. 2061.)

HELINUS (from *helinos*, a tendril; in reference to its climbing habit). ORD. *Rhamneæ.* A genus comprising two or three species of climbing shrubs, natives of Abyssinia and South Africa. Flowers umbelled. Leaves alternate, entire, cordate. Branches slender, angular. *H. ovatus* is a greenhouse shrubby climber; it requires rich, sandy loam, and plenty of pot room. Increased by seeds; and by half-ripened cuttings, placed in sand, in gentle heat.

H. ovatus (ovate). *fl.* greenish, in umbels. *l.* stalked, sub-orbicular, mucronate, feather nerved. Branches irregular; tendrils spiral. Natal, 1862.

HELIOCARPUS (from *helios*, the sun, and *karpos*, a fruit; the valves of the capsule are elegantly ciliated around on all sides). ORD. *Tiliaceæ.* A genus comprising four species of trees or shrubs, inhabiting tropical America. *H. americanus*, in all probability the only species yet introduced, is a stove evergreen shrub, thriving in sandy loam and fibry peat. Half-ripened

Heliocarpus—*continued.*

cuttings will root, during summer, in sand, under a bell glass.

H. americanus (American). *fl.* purple, small, disposed in cymes. July. *l.* cordate, serrate, three-lobed, simple. *h.* 14ft. to 20ft. 1733.

HELIOMERIS. A synonym of **Gymnolomia** (which *see*).

HELIOPHILA (from *helios*, the sun, and *phileo*, to love; in reference to the plants growing in sunny situations). ORD. *Cruciferæ.* A genus containing (according to Sonder) sixty species of annual herbs or sub-shrubs; but the number is considerably reduced by Bentham and Hooker. All are natives of South Africa. Racemes elongated. Leaves very variable. Stem round, branched. The annual species are the only sorts grown in our gardens; and these are of easy culture. Seeds should be sown in the open border, during March or April; or, for an earlier display, in March, in frames, and afterwards planted out.

H. amplexicaulis (stem-clasping). *fl.* varying from white to purplish, small. June to September. *l.*, lower ones opposite; upper ones alternate, cordate, stem-clasping, oblong, entire. *h.* 9in. 1774.

H. coronopifolia (buckhorn-leaved). *fl.* blue-violet, spreading. June to September. *l.* pinnate-parted; lobes linear, quite entire. *h.* 1ft. to 2ft. 1778.

H. pilosa (hairy). *fl.* blue. June and July. *l.* hairy; lower ones lanceolate, pinnatifid; upper ones linear, quite entire. *h.* 6in. to 12in. 1820. (B. M. 2526, under name of *H. stricta.*)

FIG. 208. HELIOPHILA PILOSA INCISA, showing Habit and detached Single Flower.

H. p. incisa (incised). *l.* linear-cuneate, trifid at the point, rarely five-fid; lobes linear or acuminate. See Fig. 208. (B. M. 496, under name of *H. arabioides.*)

HELIOPSIS (from *helios*, the sun, and *opsis*, like; in allusion to the appearance of the flowers). ORD. *Compositæ.* A genus comprising about six species of hardy herbs, perennials—with the exception of a couple of species of unintroduced annuals—two of which are from North America, and the third from Central and South America. Flower-heads rather large; corolla yellow. Leaves petiolate, all opposite or the upper ones rarely alternate. For culture, *see* **Helianthus.**

H. lævis (smooth). *fl.-heads* about 3in. across, terminal, on long stalks. Autumn. *l.* ovate-lanceolate, coarsely serrate. *h.* 3ft. to 6ft. North America, 1714. (B. M. 3372.) There is a variety, *scabra*, having a somewhat hoary involucre and roughish foliage.

HELIOTROPE. *See* **Heliotropium.**

HELIOTROPIEÆ. A tribe of *Boragineæ.*

HELIOTROPIUM (old Greek name used by Theophrastus, from *helios*, the sun, and *trope*, a turning; according to the ancients, it turned with the sun). Heliotrope; Turnsole. ORD. *Boragineæ.* A large genus (about 150 species have been described, although, in all probability, not more than 100 are entitled to specific rank)

Heliotropium—*continued.*

of ornamental, strigose, greenhouse or hardy annual herbs or sub-shrubs, rarely shrubs, widely dispersed throughout the tropical and sub-tropical regions, with eight species reaching to Europe. Flowers blue or white, small, in circinate, secund spikes; corolla salver-shaped. Leaves alternate, rarely sub-opposite. *H. peruvianum* and its varieties are amongst the most popular of cultivated plants, on account of the fragrant smell emitted by their flowers. The plants do not require any great amount of heat, but none are more quickly injured by cold, especially when this reaches the freezing point. They may be grown as dwarf decorative subjects, in small pots, or treated as large pyramid and standard specimens. Some of the varieties are very dwarf, and are useful for summer bedding. Old specimens of taller-growing ones are frequently found trained on the back wall of a warm greenhouse.

Cultivation. Heliotropiums, or Heliotropes, as they are more popularly called, may be readily increased from seeds or cuttings; the latter method being adopted with named varieties. Young growing points make the best cuttings; and early spring, or the month of August, is a good time for inserting them. If old plants are grown in heat, cuttings from them root quickly in a close frame, and their points may afterwards be used for increasing stock in preference to others not growing so vigorously. The young plants should be potted off singly, and grown on in a temperature of about 60deg., repotting in larger sizes as becomes requisite, and according to the shape or size of plant required. Cuttings intended for standards should be inserted in the autumn, and kept growing all the winter, with a single stem, until they reach the desired height, when the points may be stopped, and the side branches will soon form a head. Old plants may be grown as standards several years in comparatively small pots, by reducing and potting up again in new soil each year. The heads may be trained on trellises, or the branches merely tied in to each other. Large pyramids can be grown in one year by an autumn insertion of cuttings, and due attention. They should be transferred to the full-sized pots as soon as possible, in proportion to their growth, and each trained to a pyramid trellis of any ordinary size. Small decorative plants may be grown to flower in 5in. or 6in. pots, by keeping them pinched when young. Cuttings of varieties used for bedding, should be taken about the middle of August, inserted rather thickly in pots or pans, and placed in a close frame. These should be kept as a stock for spring propagating, and may then be thrown away, as young plants are preferable. Being extremely tender, none should be planted out until June, when the bedding season is nearly over. Standards or others, intended for winter flowering, are best placed outside in a warm position, in summer, to thoroughly ripen them. They should be housed by September, and kept in a temperature of about 55deg. in winter.

H. convolvulaceum (Convolvulus-flowered).* *fl.* white, sweet-scented, opening at night, generally opposite the leaves and terminal, short-peduncled; corolla limb ample, angulate-lobed. Summer. *l.* lanceolate, or sometimes nearly ovate, and sometimes linear, short-petioled. *h.* 2ft. New Mexico, 1867. An extremely showy hardy annual plant. (B. M. 5615.)

H. corymbosum (corymbose).* *fl.* lilac; spikes terminal, aggregate, corymbose; sepals long, subulate. May to September. *l.* oblong-lanceolate. *h.* 4ft. Peru, 1808. Greenhouse shrub. (B. M. 1609.)

H. curassavicum (Curaçoa). *fl.*, corolla limb ample, five-lobed; throat white, with a yellow eye, open; spikes mostly in pairs or twice-forked, densely flowered. June and July. *l.* linear-lanceolate, glaucous, smooth, opposite and alternate. *h.* 9in. West Indies, 1731. Stove sub-shrub. (B. M. 2669.)

H. indicum (Indian).* *fl.* bluish; spikes mostly single, densely-flowered, becoming 9in. to 1ft. long. June to August. *l.* ovate or oval, rather cordate, on margined petioles, obscurely serrate or undulate. Stem herbaceous. *h.* 1ft. West Indies, 1713. Stove annual. (B. M. 1837.)

Heliotropium—*continued.*

H. luteum (yellow). *fl.* green, yellow, hypocrateriform. June to October. *l.* stalked. Stem shrubby. *h.* 6ft. North Africa, &c., 1779. Greenhouse. (B. R. 464, under name of *Tournefortia fruticosa.*)

FIG. 209. HELIOTROPIUM PERUVIANUM, showing Habit and detached Inflorescence.

H. peruvianum (Peruvian).* Common Heliotrope; Cherry Pie. *fl.* very fragrant; spikes terminal, branched, by threes and fours, rarely compound. *l.* petiolate, oblong-lanceolate, wrinkled, repand, hairy. Stem shrubby. Peru, 1757. Greenhouse. See Fig. 209. (B. M. 141.)

H. Voltaireanum (Voltaire's). *fl.* violet. A fine dwarf-growing hybrid. Greenhouse.

Varieties. Of the numerous varieties in cultivation, the subjoined list is a good selection, most of them being of continental origin. For reference and selection, the list is further divided into classes, according to the colour of the flowers and foliage. Those marked with an asterisk are recommended either for their general floriferous habit or for their highly-perfumed flowers.

ADÈLE, flowers dark lilac, trusses very large; leaves light green, rough; vigorous, free-flowering habit. BOUQUET PERFUMÉ, flowers dark, trusses medium size; very dwarf floriferous habit; an excellent variety. BUFFON, flowers pale lilac, trusses medium size; tall free-growing habit. FLEUR D'ETÉ, flowers lilac, trusses medium; foliage dark green; rather shy-flowering. MADAME BARBEY, flowers pale-coloured, trusses small; foliage pale green. MADAME DE BLOUAY, flowers pale lilac, trusses large; foliage pale green. MADAME E. SCHILLER, flowers dark-coloured, trusses small; leaves long, narrow. MADAME JUBBINGER, flowers and leaves very dark; floriferous habit; good. MADAME M. KOPFF, flowers whitish-lilac, trusses medium; leaves rough. MADAME P. ATHLES, flowers dark-coloured, trusses large, very freely produced; foliage very dark; good. MISS NIGHTINGALE, flowers dark lilac; dwarf floriferous habit; one of the best for bedding. M. VILGRAIN, flowers pale lilac, trusses immense; very free. ROSE CLAIR, flowers dark, trusses rather small but very plentiful; foliage intensely dark. WHITE LADY, flowers whitish-lilac, becoming nearly white under glass, trusses very large, free; fine variety for winter flowering.

Class I. Foliage and Flowers dark-coloured. *MADAME JUBBINGER, *MISS NIGHTINGALE, *ROSE CLAIR.

Class II. Foliage and Flowers pale-coloured. *BUFFON, MADAME BARBEY, MADAME DE BLOUAY, MADAME M. KOPFF, *M. VILGRAIN, *WHITE LADY.

Class III. Foliage green, Flowers dark-coloured. *ADÈLE, *BOUQUET PERFUMÉ, FLEUR D'ETÉ, MADAME E. SCHILLER, *MADAME P. ATHLES.

HELIPTERUM (from *helios*, the sun, and *pteron*, a wing; referring to plumed pappus). Including *Astelma* and *Rhodanthe*. ORD. *Compositæ*. A genus comprising forty-two species of half-hardy annual or perennial herbs, rarely small shrubs, of which twelve are from South Africa, and the rest from Australia. The genus is closely allied to *Helichrysum*, but is distinguished from it by having the hairs of the pappus plumose or feathery, instead of pilose (rough). Helipterums may be raised from seeds, sown rather thickly in the open ground, about the end of March. A rather rich soil and warm position should be selected. *H. Manglesii* is a pretty

Helipterum—*continued.*

and useful subject for pot culture. Seeds of it should be sown early in March, and placed in a warm house; when the young plants are large enough to handle, they should be pricked off, about eight in a 5in. pot, and grown on until they flower. This species may also be grown, with others, in the open ground.

H. canescens (hoary). This is the correct name of the plant described in this work as **Astelma canescens** (which *see*). (B. M. 420, under name of *Xeranthemum canescens.*)

H. Cotula (Cotula-flowered). *fl.-heads* yellow, or white with a yellow eye; involucral scales radiating, scarious, oblong or oblong-lanceolate; pappus hairs thickened upwards, very plumose; achenes smooth. May. *l.* scattered (opposite in very young, weak plants), 1in. long, filiform, terete. Stem terete, generally much branched from the base, but sometimes single; branches very slender. *h.* 6in. to 24in. West Australia. Annual. (B. M. 5604.)

H. gnaphalioides (Gnaphalium-like). *fl.-heads*, peduncles terminal, 2in. to 3in. long, cottony; involucre broadly cylindrical, of several imbricated reddish scales, cottony; receptacle faveolated; florets yellow, tubular, perfectly five-toothed. June. *l.* alternate, 2in. long, linear, almost filiform, waved, semi-cylindrical on the back, grooved in front, downy. Stems decumbent at base, throwing up numerous erect, downy branches. *h.* 1ft. to 1½ft. Cape of Good Hope, 1824. Perennial. (B. M. 2710, under name of *Gnaphalium modestum.*)

FIG. 210. HELIPTERUM HUMBOLDTIANUM, showing Habit and detached Inflorescence.

H. Humboldtianum (Humboldt's).* *fl.-heads* small, numerous, in dense terminal corymbs; involucre cylindrical; outer bracts closely imbricate, with very short, squarrose, scarious tips; inner ones with slightly woolly-ciliate claws, and radiating, rather rigid, petal-like laminæ, of a bright yellow, passing (when dry) into a metallic green. *l.* linear or linear-lanceolate, acute. *h.* 1ft. to 2ft. Western Australia, 1863. An erect woolly-white or at length nearly glabrous annual. See Fig. 210. SYN. *H. Sandfordii* (under which name it is figured in B. M. 5350).

H. incanum (white). *fl.-heads* large; involucral bracts yellow, pink, or white; peduncles leafless. *l.* linear, crowded at the base of the stem. *h.* 9in. Australia. Plant dwarf, tufted, branching, downy. Half-hardy annual. (B. M. 2881.)

H. Manglesii (Mangles').* *fl.-heads* showy, on long peduncles bearing a few scarious scales; involucre hemispherical, when fully out the outer bracts sessile and scarious, the inner ones with a narrow claw and oblong, radiating, petal-like lamina, varying from a pale to a rich pink, and sometimes deep purple at the base; florets yellow or purple. *l.* ovate-oblong or broadly-lanceolate, clasping the stem with rounded auricles. *h.* 1ft. to 1½ft. Western Australia. An erect, glabrous, corymbosely branched annual. (B. M. 3483, 5283, 5290; B. R. 1703; S. B. F. G. ser. ii. 295, under name of *Rhodanthe Manglesii.*)

H. Sandfordii (Sandford's). A synonym of *H. Humboldtianum.*

H. speciosissimum (very showy). This is the correct name of the plant described in this work as **Astelma speciosissimum** which *see*). (A. B. R. 51, under name of *Xeranthemum speciosum.*)

HELLEBORE. *See* **Helleborus.**

HELLEBORINE. *See* **Epipactis.** and **Serapias**

HELLEBORUS (from *Helleboros*, the old Greek name used by Theophrastus; probably of foreign origin). Hellebore. ORD. *Ranunculaceæ.* A genus comprising about a dozen species of ornamental hardy, erect, perennial herbs, inhabiting South Europe and Western Asia. Flowers white, greenish, yellow or purple, rather large, solitary, or paniculate; sepals five, regular, usually persistent; petals small, tubular. Leaves palmate or pedate, leathery. Hellebores thrive in almost any ordinary garden soil, but a rich loam, with a moist, rather shady, perfectly drained situation, suits them best. A top-dressing of good rotten manure, about the end of March, after the plants have finished flowering, is very beneficial. Hellebores should be planted so that they may be conveniently shaded when in flower, as, being usually produced in winter and early spring, the blossoms—the white sorts especially—are damaged with mud splashes. *H. niger* and its varieties, popularly known as Christmas Roses, are largely cultivated for the use of their flowers, in a cut state, in mid-winter. The roots may be lifted, and placed in a gentle heat, under glass; but they should not be forced much. The flowers will be better, if only the protection of a frame or hand glass is afforded them, in the open ground; or they may be improved by cutting, and allowing them to expand in water, in a warm house. All are easily increased by root divisions, but the stock should be strong and healthy. Seeds may also be sown so soon as ripe; but this mode of propagation is very slow, and scarcely worth the trouble involved, unless new varieties are desired.

H. abchasicus (Abchasian). *fl.* green or purplish, nutant, about 2in. across; sepals oval, waved, not overlapping each other; petals numerous; anthers yellow. January to March *l.* about 1ft. in diameter, with five to seven spathulate-lanceolate, widely spreading, smooth, toothed leaflets. *h.* 1ft. Caucasus. Evergreen.

H. atrorubens (dark-red). *fl.* deep purple when young, with the edges and centre ultimately dull purple; sepals roundish, about 1in. long. March. *l.*, radical ones pedate; cauline ones almost sessile, palmate. Stems branched, two to four-flowered. *h.* 18in. South Europe, 1820. (B. M. 4581.)

H. caucasicus (Caucasian). *fl.* pale green; sepals much imbricated, about 1½in. long. *l.* very glossy, oblong, 3in. to 4in. broad. *h.* 1½ft. Caucasus, 1853.

FIG. 211. HELLEBORUS CAUCASICUS PUNCTATUS, showing Habit and detached Single Flower.

H. c. punctatus (dotted). A garden hybrid, with rosy-coloured dotted sepals. See Fig. 211.

H. colchicus (Colchican). *fl.* deep bright purple; sepals somewhat round and flat, much imbricated; stamens yellow. January to March. *l.* very large, pedate, dentate, distinctly veined. Stems three to six-flowered. *h.* 18in. Asia Minor. (R. G. 293.)

H. fœtidus (fœtid). Bear's Foot. *fl.* green, nearly 1in. across, disposed in panicled cymes; sepals edged with brown, which turns to a purplish tint. December to April. *l.* alternate, persistent, dull green, small, pedate; segments linear, shallowly

Helleborus—*continued.*

inciso-serrate. *h.* 2ft. Europe (Britain). Very distinct and ornamental. See Fig. 212. (Sy. En. B. 45.)

FIG. 212. FRUIT OF HELLEBORUS FŒTIDUS.

H. lividus (livid). *fl.* pale green, ten to twenty in a deltoid corymb; sepals nearly flat and spreading. March. *l.* trifid, glabrous; segments oblong-lanceolate, acute, sharply toothed. Stems erect, bearing eight or ten leaves crowded near the base, below the inflorescence. *h.* 1½ft. Corsica. (B. M. 72.)

FIG. 213. HELLEBORUS NIGER.

H. niger (black).* Christmas Rose. *fl.*, when protected by glass, pure white, 2in. to 3in. across; scapes stout, leafless, one to four-flowered. Winter. *l.* radical, large, pedate, persistent; segments oblanceolate-rhomboid, shallowly incised. *h.* 6in. to 18in. Central and Eastern Europe, Western Asia, 1596. The roots of this species are occasionally used in medicine. See Fig. 213. (B. M. 8.) There are two or three varieties of this fine species: *altifolius* (see Fig. 214), usually known as *major*, and also as *maximus*, has very large flowers, measuring about 4in. across; it is one of the best of the genus. *angustifolius* (SYN. *minor*) has both foliage and flowers smaller than the typical species, and comes into bloom much earlier. There is also a form having foliage distinctly margined with white.

FIG. 214. HELLEBORUS NIGER ALTIFOLIUS.

Helleborus—*continued.*

H. odorus (sweet-scented). *fl.* green, sweet-scented, drooping, 2in. across; corymb three or four-flowered. February to April. *l.* pale green, veined with white, one or two in a tuft to a flowering stem, pedate; segments six to eight, lanceolate, regularly toothed. *h.* 1½ft. Eastern Europe, 1817. (B. R. 1643.)

H. o. purpurascens (purplish). *fl.* purplish-red, about 2in. across; sepals roundish, imbricated, incurved at the edges; stamens and anthers creamy-white. Stem one or two-flowered. *h.* 6in. to 10in. Hungary, 1817.

H. olympicus (Olympian).* *fl.* purplish; sepals round, about 1in. long and broad. Spring. *l.* digitate-pedate, or palmate, with five to seven linear-oblong, smooth, dentate-serrate lobes. Stems two or three-flowered. *h.* 2ft. Greece, 1840. See Fig. 215. (B. R. 1842, 58.)

FIG. 215. HELLEBORUS OLYMPICUS, showing Habit, and fully and partially expanded Flowers.

H. orientalis (Eastern). *fl.* rose-coloured, large; sepals much imbricated, spreading; flowering stems with two to six blossoms, and large, deeply palmately cut, foliaceous bracts. February to May. *l.* shortly pedate, persistent, pubescent beneath; segments seven to nine, oblanceolate-oblong, not palmately cut, serrate. *h.* 1ft. to 2ft. Greece, 1839. Several forms, usually described as species, are mere varieties of *H. orientalis*. Among others, the following may be enumerated: *antiquorum* differs from the type by its glabrous leaves, produced two in a tuft; flowers white, softly toned with pink and grey. *guttatus*, flowers 2in. across, white; sepals spotted with purple; leaves two in a tuft, with a flowering stem. Some of the hybrids of *H. orientalis* are: *elegans*, *iridescens*, and *punctatus*.

H. viridis (green). *fl.* bright green; flowering stem with five or six distinct blossoms, and large, deeply palmately cut, foliaceous bracts; sepals roundish-ovate. Spring. *l.* pedate, with crowded, oblanceolate, serrated segments. *h.* 1½ft. Europe (Britain), &c. (Sy. En. B. 44.)

HELMET FLOWER. A common name applied to **Aconitum, Coryanthes,** and **Scutellaria** (which *see*).

HELMHOLTZIA (named after Hermann Helmholtz, a celebrated Prussian professor, born in 1821). ORD. *Philydraceæ*. A genus of a couple of species of greenhouse tufted herbaceous perennials, one of which is from Australia, and the other—the one described below—from the Pacific Islands. They thrive in a well-drained sandy loam and peat compost, and require plenty of water. Increased by divisions, or by seeds.

Helmholtzia—*continued.*

H. glaberrima (very glabrous). *fl.* white, panicled. May. *l.* ensiform, acuminate, equitant, 1in. broad. *h.* 3ft. 1873. (B. M. 6056, under name of *Philydrum glaberrimum.*)

HELMIA (named after C. Helm, a German ecclesiastic). ORD. *Dioscoreaceæ.* A stove evergreen climber, now included under **Dioscorea** (which *see* for culture).

H. racemosa (raceme-flowered). *fl.* yellow, purple; male raceme axillary, solitary. *l.* scattered, cordate-ovate, acuminate, nine-nerved, glandular at base. Roots tuberous. *h.* 8ft. Central America, 1850.

HELMINTHOSTACHYS (from *helmins, helminthos*, a little worm, and *stachys*, a spike; in allusion to the arrangement of the sporangia). ORD. *Filices.* A curious and handsome stove fern, closely allied to *Botrychium.* Capsules in small crested clusters, which form a long loose spike. For culture, *see* **Ferns.**

H. dulcis (sweet). A synonym of *H. zeylanica.*

H. zeylanica (Cingalese). *rhiz.* thick, creeping. *sti.* often 1ft. long. *fronds*, barren segments palmato-pinnate, often in three principal divisions, which are stalked and again forked or pinnate, the ultimate divisions linear-oblong, 3in. to 4in. long, nearly 1in. broad; fertile spike solitary, arising from the base of the barren segments, 3in. to 4in. long, ½in. broad. Himalaya to Queensland, 1861. SYN. *H. dulcis.* (H. G. F. 28.)

HELONIAS (from *helos*, a marsh; habitat of species). ORD. *Liliaceæ.* A monotypic genus, the species being a pretty hardy herbaceous perennial, from North America. It thrives in a sandy fibry loam and peat compost, and in a moist, shaded situation. Increased slowly by divisions of the roots, or by seed.

H. bullata (bullate). *fl.* purplish-rose, small; lower ones with linear-lanceolate bracts; spike oval. Summer. *l.* radical, oblong-lanceolate, acute, veined, shorter than the flower stems. *h.* 1ft. to 1½ft. 1758. SYN. *H. latifolia.* (B. M. 747.)

H. latifolia (broad-leaved). A synonym of *H. bullata.*

HELWINGIA (named in honour of Georg. A. Helwing, a writer on the botany of Prussia). ORD. *Araliaceæ.* A genus consisting of but two species, one Himalayan and the other Japanese. They are glabrous trees, more curious than beautiful, and scarcely worth cultivating, except in botanical collections.

H. ruscifolia (Ruscus-leaved). *fl.* small, clustered on the midrib of the leaves; perianth three to four-parted, with ovate spreading segments. *fr.* drupaceous. *l.* alternate, petiolate, acuminate, stipulate. Japan. A low tree. The young leaves are used in Japan as a vegetable (S. Z. F. J. 86.)

HELWINGIACEÆ. A tribe of *Araliaceæ.*

HEMEROCALLEÆ. A tribe of *Liliaceæ.*

HEMEROCALLIS (old Greek name used by Theophrastus, from *hemero*, a day, and *kallos*, beauty; in reference to its short-lived splendour). Day Lily. ORD. *Liliaceæ.* Very ornamental hardy herbaceous perennials. Flowers corymbose; segments of the perianth united at the base into a narrow tube, inclosing the free ovary. Leaves long, narrow, radical. All the species are of easy culture in ordinary garden soil, and are admirably adapted for shrubberies, or for clumps. The flowers are somewhat ephemeral, but they are produced successively and in abundance. Increased by divisions.

H. alba (white). A synonym of *Funkia subcordata.*

H. cærulea (blue). A synonym of *Funkia ovata.*

H. cordata (heart-shaped). A synonym of *Funkia subcordata.*

H. disticha (two-ranked). A synonym of *H. fulva.*

H. Dumortieri (Dumortier's). *fl.* orange-yellow, tinged with brown on the outside, large, about 2in. long; scape erect, two to four-flowered. Summer. *l.* long, narrow, tapering, 1ft. to 1½ft. long. *h.* 1ft. to 1½ft. Japan and Eastern Siberia. Very closely allied to *H. minor.* SYNS. *H. rutilans* and *H. Sieboldii.* (Ref. B. 213.)

H. flava (yellow). *fl.* orange-yellow, very fragrant, erect; perianth segments flat, veinless. Summer. *l.* numerous, narrow, 2ft. to 2½ft. long, keeled. *h.* 2ft. to 3ft. South Europe to Western Siberia and Japan, 1596. (B. M. 19.)

H. fulva (tawny).* *fl.* large, about 4in. wide, inodorous, few in a cluster; perianth segments venous and wavy. Summer. *l.* broad, long, keeled. *h.* 2ft. to 4ft. South Europe to Japan, 1596. SYN. *H. disticha.* See Fig. 216. (B. M. 64.) *H. Kwanso* is a variety with large double bronzy orange-coloured flowers (R. G. 500); of this form, there is also a sub-variety, with handsome variegated foliage.

Hemerocallis—*continued.*

FIG. 216. HEMEROCALLIS FULVA.

H. graminea (grass-like). A synonym of *H. minor.*

H. japonica (Japanese). A synonym of *Funkia subcordata.*

FIG. 217. HEMEROCALLIS MIDDENDORFII, showing Habit and detached Head of Flowers.

H. Middendorfii (Middendorf's). *fl.* deep golden-yellow, three or four in a terminal head; perianth segments flat, with branched veins. Summer. *l.* long, rather broad. *h.* 2ft. to 3ft. Eastern Siberia to Japan. See Fig. 217. (R. G. 522.)

H. minor (lesser). *fl.* yellow, slightly tinged with green, rather small, and slightly fragrant; three inner perianth segments wavy. Summer. *l.* very narrow, keeled, pointed. *h.* 4in. to 8in. Siberia, Northern China, and Japan, 1759. SYN. *H. graminea.* (A. B. R. 244.)

H. plantaginea (Plantain-like). A synonym of *Funkia subcordata.*

H. rutilans (ruddy). A synonym of *H. Dumortieri.*

H. Sieboldii (Siebold's). A synonym of *H. Dumortieri.*

HEMIANDRA (from *hemi*, a half, and *andros*, a male; alluding to the dimidiate anthers). ORD. *Labiatæ*. A genus comprising three species of greenhouse shrubs or sub-shrubs, inhabiting South-west Australia. Flowers white or pink, axillary, solitary, with a pair of bracts under the calyx. Leaves opposite, entire, narrow, rigid, pungent-pointed. The species thrive in a sandy loam and peat compost. Propagated by cuttings, made of half-ripened wood, and inserted in sand, under a bell glass, during April.

H. pungens (stinging). *fl.* white or pink, with darker spots; calyx two-lipped; corolla tube exserted and dilated into a broad throat. May. *l.* sessile, linear or linear-lanceolate, rigid, acute, with pungent points. *h.* 1ft. to 2ft. A diffuse or spreading rigid shrub. The following, according to Bentham, are but forms of above: *H. brevifolia*, *H. emarginata*, *H. glabra*, *H. hirsuta*, and *H. rupestris*. (L. J. F. 126.)

HEMICHÆNA (from *hemi*, half, and *chaino*, to gape; in allusion to the two-lipped corolla). ORD. *Scrophularineæ*. A monotypic genus. The species is a handsome half-hardy shrub. It thrives in a loam and peat compost. Ripened cuttings will root, under a hand glass, in bottom heat.

H. fruticosa (shrubby). *fl.*, cymes usually three-flowered, much shorter than the leaves; calyx ½in. long, tubular; corolla golden-yellow. July. *l.* opposite, 4in. to 8in. long, 2in. to 2½in. broad, oblong-lanceolate, acuminate, irregularly or doubly toothed, dark green, pubescent on both surfaces. *h.* 3ft. to 5ft. Guatemala and Costa Rica, 1873. (B. M. 6164.)

HEMICLIDIA BAXTERI. A synonym of **Dryandra falcata** (which *see*).

HEMIDICTYUM. *See* **Asplenium.**

HEMIMERIS (from *hemi*, half, and *meris*, a part; upper lip of corolla nearly obsolete). ORD. *Scrophularineæ*. A genus comprising about four species of annual herbs, natives of Southern Africa. Corolla yellow, expanded, sub-bilabiate, four-fid, the upper segment very shortly emarginate, the lower segment very large, the lateral short and wide; calyx five-parted; peduncles axillary, one-flowered, deflexed after flowering. Leaves opposite. *H. montana*, perhaps the only species yet introduced, is a greenhouse herbaceous plant, of easy culture in loam and peat. Young cuttings root freely, in a sandy soil, in bottom heat.

H. montana (mountain). *fl.* scarlet, terminal and axillary; corolla rotate, ringent. July. *l.* opposite, ovate, serrated. *h.* 6in. Cape of Good Hope, 1816.

FIG. 218. HEMIONITES PALMATA.

HEMIONITES (old Greek name used by Dioscorides, from *hemionos*, a mule; supposed to be barren). ORD. *Filices*. A genus comprising eight species of stove ferns, found in both hemispheres. Sori continues along the veins, and copiously reticulated. The species are admirably suited for growing in Wardian cases. For culture, *see* **Ferns.**

H. cordata (heart-shaped). *cau.* erect. *sti.*, of the barren fronds, 2in. to 4in. long; of the fertile ones, about 1ft. long, densely fibrillose at base. *fronds* 6in. to 9in. long, 1in. to 2½in. broad, ovate or oblong-lanceolate, apex acuminate, edge sub-entire, base narrowed. *sori* contined to the veins. India, &c.

H. palmata (palmate). *cau.* erect. *sti.*, of barren fronds, 4in.; of the fertile one, 6in. to 12in. long, hairy. *fronds* 2in to 6in. each way, palmate, with five nearly equal lanceolate divisions; both surfaces villose. West Indies, &c., 1793. See Fig. 218. (H. E. F. 53.)

H. pinnata (pinnate). *sti.* 6in. to 9in. long, glossy, dark chestnut-brown, clothed with soft yellowish hairs. *fronds* 5in. to 6in. long, 3in. to 4in. broad, the apex deeply pinnatifid, below this two or three pairs of distinct pinnæ, the upper ones oblong-lanceolate, the lowest larger and forked at the base, all repand. Jamaica.

HEMIPHRAGMA (from *hemi*, half, and *phragma*, a partition; referring to the division of the capsule). ORD. *Scrophularineæ*. A monotypic genus, the species being a nearly hardy prostrate herb, often spreading to a great extent. It thrives in a well-drained loam, and, provided it is sheltered in a cold frame, during winter, succeeds without much care.

H. heterophyllum (variable-leaved). *fl.* pink, small, usually sessile and solitary; corolla campanulate, five-lobed. Summer. *fr.* fleshy, black. *l.*, principal ones along the branches, small, rounded, cordate, with dense clusters of short, subulate, secondary leaves in their axils. Himalayas.

HEMISTEMMA. Included under **Hibbertia** (which *see*).

HEMITELIA (from *hemi*, half, and *telia*, a lid; in reference to the shape of the indusium). ORD. *Filices*. A genus of about thirty species of very beautiful stove and greenhouse tree ferns. Fronds ample, pinnate or decompound. Sori globose, dorsal, upon a vein or veinlet; receptacle elevated; involucre a scale situated on the under side of the sorus, of variable size, shape, and texture. For culture, *see* **Ferns.**

H. capensis (Cape). *cau.* 12ft. to 14ft. high, scaly at base, often bearing multifid pinnæ. *fronds* ample, sub-membranaceous, bi-tripinnate; primary pinnæ petiolate, ovate-oblong; pinnules sub-sessile, 2in. to 3in. long, ½in. wide, oblong-acuminate, deeply pinnatifid or again pinnate; lobes linear-oblong, acute, strongly serrated. *sori* frequently solitary at base of lobe or pinnule, rarely three or four; receptacle large, prominent. South Africa, Brazil, Java. Greenhouse.

H. grandifolia (large-fronded).* *sti.* aculeated. *fronds* ample, pinnated; pinnæ sessile, 1ft. to 1½ft. long, elongate-oblong, acuminated, 1in. to 2in. broad; lobes broad-oblong, obtuse, serrated at the apex. *sori* on the free veins, in a continual line, intermediate between the costule and the margin. West Indies, &c., 1852. Stove.

H. horrida (horrid). *sti.* strongly aculeated. *fronds* 7ft. to 10ft. long, pinnate; pinnæ sessile, 1ft. to 2ft. long, broad, oblong-lanceolate, deeply pinnatifid; lobes 3in. long, oblong-lanceolate, acuminate. *sori* on the free veinlets, forming a continued line just within the margin. West Indies, &c., 1843. Stove.

H. Karsteniana (Karsten's). *sti.* muricated and scaly at the base. *fronds* ample, pinnated; pinnæ sessile, 6in. to 12in. long, 2in. broad. *sori* in two oblique lines, meeting towards the rachis. Venezuela. Stove.

H. multiflora (many-flowered). *sti.* muricated, scaly. *fronds* ample, tripinnatifid; pinnæ oblong-lanceolate, 1ft. to 1½ft long; pinnules 3in. to 4in. long, ligulate, nine to ten lines broad, cut down to a narrow wing. *sori* small, medial. South America, 1824. Stove.

H. setosa (bristly). *sti.* short, grey, muricated; basal scales dark brown; rachises grey-stramineous, naked, smooth. *fronds* ample, tripinnate; pinnæ oblong-lanceolate, 1ft. to 1½ft. long, lower diminished, lowest dimorphous, with pinnated subulate segments; pinnules ligulate, 3in. to 4in. long, ¾in. broad, cut down to rachis below; segments ¼in. broad, bluntish, falcate, barren, broad, fertile, narrower; both sides green, glabrous. *sori* costular; involucre small, depressed, glabrous. Brazil. Stove.

H. Smithii (Smith's).* *sti.* below densely crinite, with rigid, elongated, serrulated scales; rachis and costa below sparsely pilose, with lax, rufous, deciduous scales above, strigoso-villous. *fronds* bipinnate; primary pinnæ linear-elongate, acute, sub-falcate, serrated or crenate, very glabrous, the costules beneath paleaceous or pilose or glabrous. *sori* on the forking of the veins; involucre hemispherical. New Zealand. Arboreous, unarmed. Greenhouse. SYN. *Cyathea Smithii.*

Hemitelia—*continued.*

Fig. 219. Hemitelia speciosa.

H. speciosa (showy).* *cau.* 20ft. to 24ft. high. *sti.* tuberculate-submuricate. *fronds* ample, pinnate, very long, pinnatifid at the extremity; pinnæ firm, satiny, 8in. to 12in. long, 1in. to 1½in. broad, elongato-ensiform, acuminate. *sori* arranged in a sinuous continued chain or line just within the margin. Tropical America. Stove. See Fig. 219.

HEMLOCK. *See* **Conium.**

HEMLOCK SPRUCE. *See* **Tsuga canadensis.**

HEMP. The name of various valuable fibres employed for manufacturing purposes. The common name for *Cannabis sativa.*

HEMP AGRIMONY. *See* **Eupatorium cannabinum.**

HEN AND CHICKENS. A name given to a proliferous form of the Daisy, **Bellis perennis** (which *see*).

HENBANE. *See* **Hyoscyamus niger.**

HENFREYA SCANDENS. A synonym of **Asystasia scandens** (which *see*).

HENNA PLANT. *See* **Lawsonia alba.**

HEP, or HIP. The fruit of the Dog Rose, *Rosa canina,* and other species of *Rosa.*

HEPATICA. *See* **Anemone Hepatica.**

HEPIALUS HUMULI. *See* **Otter Moth.**

HEPTAPLEURUM (from *hepta,* seven, and *pleuron,* a rib; in allusion to the ribbed fruit). Syns. *Paratropia* and *Sciadophyllum.* Ord. *Araliaceæ.* A large genus about sixty species have been described) of tall shrubs or trees, widely distributed from Australia to Africa. Flowers pentamerous or hexamerous, collected into large panicles of racemes or umbels. Leaves alternate, digitate, compound or decompound. For culture, *see* **Aralia.**

H. polybotryum (many-clustered). *fl.* green, small racemes 1ft. and upwards long, covered with minute, very deciduous, stellate pubescence. Winter. *fr.* globose, five-celled, the size of a peppercorn. *l.* alternate, digitate; petiole 5in. to 8in. long, slender, swollen at the base and apex, warted in the lower half; leaflets five to seven, 6in. to 8in. long, oblong-ovate to obovate-oblong, caudate-acuminate, quite entire; base rounded or cuneate. Stem covered with hemispheric warts. Java, 1860. A slender, sparingly-branched, large stove shrub. (B. M. 6238.)

Heptapleurum—*continued.*

H. venulosum (veined). *fl.* greenish. *l.*, leaflets entire, acuminate. India. A small glabrous tree or climbing shrub. Stove.

HERACLEUM (*Heracleon,* the old Greek name of the plant; so called in honour of Heracles, or Hercules). Cow Parsley; Cow Parsnip. Ord. *Umbelliferæ.*

Fig. 220. Leaf of Heracleum setosum.

A genus comprising about seventy species of strong, coarse-growing, hardy biennial or perennial herbs, from the mountains of Central and Southern Europe, and especially Asia, with a single North American one. Flowers white; the petals of the outer ones of each umbel larger. Leaves dissected, with large segments. Although long

Fig. 221. Heracleum sibiricum.

Heracleum—*continued.*

known to cultivation, Heracleums are not possessed of any very special recommendations. They are best adapted for growing in shrubberies, rough parts of pleasure grounds, or on the margins of water, being too coarse for the flower garden. They succeed in almost any kind of soil. Increased readily by seeds, or by divisions. The species are much confused.

H. giganteum (gigantic). A synonym of *H. villosum*.

H. setosum (bristly). *l.* ternate; leaflets petiolate, distantly five-lobed; lobes dentate. Stem, petioles, and leaves hispid. South Europe. See Fig. 220.

FIG. 222. UMBEL OF HERACLEUM SIBIRICUM.

H. sibiricum (Siberian). *fl.* yellowish, not radiating; umbels large. Summer. *l.* pinnate, rough from hairs; leaflets ovate or oblong. *h.* 5ft. to 6ft. Europe, Asia, 1789. See Figs. 221 and 222.

H. villosum (villose). *fl.* white; umbels many-rayed. *l.* pinnatifid, deeply toothed. Stem 10ft. to 12ft. high. Caucasus, 1820. This species has, of late years, been extensively cultivated, on account of its large size and commanding appearance. SYN. *H. giganteum.*

HERBACEOUS. Thin, green, and cellular, as the tissue of membranous leaves. Also, producing an annual stem from a perennial root.

HERBACEOUS PLANTS. A term generally applied to any border perennials which are not shrubby in habit.

HERBARIUM. A collection of dried plants, systematically arranged.

HERBERTIA (named after Dr. Wm. Herbert, 1778-1847, once Dean of Manchester, and a distinguished botanist, famous for his knowledge of bulbous plants). ORD. *Irideæ.* A genus (now referred by Bentham and Hooker to *Alophia*) of some half-dozen species of pretty half-hardy bulbous plants, allied to *Tigridia*; natives of Texas, Chili, and South Brazil. The species are rarely seen in gardens, and, in all probability, those described below are the only ones yet introduced. Flowers blue or yellow, pretty, produced at the top of a short scape; perianth short-tubed, six-parted, the outer segments triangular, acute, and reflexed, and the shorter inner ones rounded and erect. The species thrive in sandy loam and peat. Propagated by seeds, or by offsets.

H. cærulea (blue).* *fl.*, peduncles shorter than the bracts; claws of sepals white, blue-dotted; segments blue, spotted; petals blue, acute; anthers and stigmas short. *l.* grass-like, ribbed, narrowed to both ends. *h.* 6in. Texas. (B. M. 3862, Fig. 3.)

H. Drummondiana (Drummond's). *fl.* violet; sepals spotted with white on claws; petals small, recurved. June to August. *l.* broad, plicate, 6in. long. Texas, 1839.

H. pulchella (neat). *fl.* blue, purple; perianth segments bearded at base. July. *l.* linear-ensiform, acute at both ends, plicate. *h.* 9in. Chili and South Brazil, 1827. (B. M. 3862, Figs. 1 and 2.)

HERB OF GRACE. *See* **Ruta graveolens.**

HERB-PARIS. *See* **Paris quadrifolia.**

HERB-PATIENCE. *See* **Patience.**

HERB-ROBERT. *See* **Geranium Robertianum.**

HERBS. In many gardens, the cultivation of Herbs does not receive the attention their usefulness deserves. Some sorts are rarely required, beyond a small portion of their leaves for flavouring; still, in many cases, the flavour cannot be obtained from any other material. Those which are herbaceous perennials—Horehound and Mint, for instance—should be cut on a dry day, in summer, when the flowers are just fully opened, and dried slowly in a cool shed for winter use. The annuals and evergreen perennials are best if procurable in a green state; but several of them answer their purpose when dried, and some should, consequently, be kept in reserve. Herbs should always be dried slowly, and not placed in the sun nor in fire heat. The flavour may be preserved much better by rubbing off the leaves when they are quite dry, and corking them close in wide-mouthed bottles. A piece of ground specially devoted to Herbs, is the best arrangement in any garden; at least, for the cultivation of those of which only a few plants need be kept. Plenty of room should be allowed for getting amongst them to gather any particular sort, and to keep the soil hoed. Part of the space might be devoted to the annual sorts, in preference to placing them amongst other crops in different parts of the garden. Parsley requires special treatment and attention, as it is always of great importance for garnishing. The following list comprises most of the useful Herbs in cultivation for flavouring purposes, &c.: Angelica, Balm, Basil (Bush and Sweet), Borage, Burnet, Carraway, Chamomile, Chervil, Chives, Coriander, Dill, Fennel, Horehound, Hyssop, Lavender, Marigold, Marjoram (Sweet), Mint, Parsley, Pennyroyal, Purslane, Rosemary, Rue, Sage, Savory (Summer and Winter), Southernwood, Tansy, Tarragon, Thyme, and Wormwood.

HERCULES' CLUB. *See* **Xanthoxylum Clava-Herculis.**

HERITIERA (named after Charles Louis L'Héritier, 1746-1800, a celebrated French botanist). Looking-glass Tree. SYN. *Balanopteris.* ORD. *Sterculiaceæ.* A genus comprising about three species of stove evergreen trees, found on the shores of tropical Asia and Australia. Flowers unisexual, small, disposed in axillary panicles. Leaves undivided, coriaceous, penninerved, silvery-white underneath (whence the common name). Heritieras thrive in sandy loam. Large ripened cuttings will root freely in sand, under a glass, in moist heat.

H. littoralis (shore). *fl.* reddish. *l.* large, coriaceous, oval-oblong, rounded at the base, silvery beneath. Tropical coasts of Old World, 1780.

H. macrophylla (large-leaved).* This resembles *H. littoralis*, but has larger leaves and sub-erect fruit. India, &c.

HERMANNIA (named after Paul Hermann, 1646-1695, at one time Professor of Botany at Leyden). A large genus of ornamental greenhouse evergreen shrubs, generally clothed with starry tomentum. Flowers usually yellow, drooping; peduncles axillary, and few-flowered. Leaves dentate or incised. About eighty species have been described, but very few are in cultivation. Three are natives of Mexico or Texas, four of tropical Africa or Arabia; all the rest are extra-tropical South African. For culture, *see* **Mahernia.**

H. althæifolia (Mallow-leaved). *fl.* dark yellow or sulphur-coloured; peduncles solitary or twin, two or three-flowered, longer than the leaves. March to July. *l.* tomentose, obovate, plaited, crenate. *h.* 3ft. Cape of Good Hope, 1728. (B. M. 307.)

H. flammea (flame).* *fl.* orange-coloured or red; peduncles one or two-flowered; racemes terminal. Summer. *l.* smooth, wedge-shaped, lanceolate, truncated, and toothed at the apex. *h.* 1ft. to 3ft. Cape of Good Hope, 1794. (B. M. 1349.)

HERMANNIEÆ. A tribe of *Sterculiaceæ.*

HERMAPHRODITE. Containing both male and female organs.

HERMINIERA (from *hermine*, a bedpost; in allusion to the shape of the stems). SYN. *Œdemone*. ORD. *Leguminosæ*. A monotypic genus, the species being a tall stove shrub. It thrives best if the pot be partially submerged in a warm-water tank. Propagated by seeds.

H. Elaphroxylon (Elaphroxylon). *fl.* large; corolla yellow, papilionaceous; calyx two-lipped; stamens in two bundles of five each, with uniform anthers. *l.* impari-pinnate; leaflets exstipellate. Tropical Africa. This plant grows in the beds of shallow stagnant rivers of the Upper Nile country, sometimes in such thick masses as to impede navigation. It is the "Ambash," or Pith-tree, so frequently mentioned in books of tropical African travels.

HERMINIUM (from *hermin*, the foot of a bed; in allusion to the knob-like shape of the root). Musk Orchis. ORD. *Orchideæ*. A genus comprising but a few species of curious and interesting orchids, all natives of the temperate or alpine regions of Europe and Asia. They are closely allied to *Orchis*, but the perianth has no spur, and the anther cells are distant at their base, the glands of the stalks of the pollen masses protruding below the cells. *H. Monorchis*, the commonest and most widely-spread species, is best grown on dry chalky banks. It may be propagated by divisions.

H. Monorchis (one-bulbed). *fl.* greenish-yellow, small, numerous, with a musky odour; spike dense; lip without a spur, deeply three-lobed. July. *l.* radical, two, oblong or lanceolate. *h.* 3in. to 6in. Europe (Britain), Siberia, Himalaya. (Sy. En. B. 1466.)

HERNANDIA (named after Francisco Hernandez, physician to Philip II. of Spain, and a writer on the Flora of Mexico). Jack-in-a-Box. ORD. *Laurineæ*. A genus comprising five or six species of elegant stove evergreen trees, widely dispersed throughout the tropical regions of both hemispheres. Flowers yellowish, monœcious, in panicles; sepals petaloid. Leaves cordate, peltate, smooth. Hernandias require a compost of sandy loam and peat. Ripened cuttings, with leaves intact, root freely in sand, under a glass, if placed in brisk bottom heat. Probably the only two species now in cultivation are those here described.

H. Mœrenhoutiana (Mœrenhout's).* *fl.* dirty yellow, three in each involucre, two males and one female; peduncles axillary, equalling the leaves, nearly glabrous. October. *l.* coriaceous, 3in. to 5in. long, alternate, long-petioled; young ones elliptic; old ones broadly ovate-cordate, obtuse, entire, glabrous above, the nerves and midrib beneath pilose. Pacific Islands, 1869. A small tree. (B. M. 5839.)

H. sonora (sounding). *fl.* whitish-green, corymbose. *l.* simple, roundish, with a lively red centre. *h.* 50ft. India, 1693. This species forms a very handsome plant for sub-tropical gardening, for which purpose it is much employed on the Continent. The leaves produce a juice that is a powerful depilatory; it destroys hairs without pain wherever it is applied.

HERNIARIA (from *hernia*, a rupture; in reference to the supposed effect of the plant in curing rupture). ORD. *Illecebraceæ*. A genus consisting of eight or ten species of herbs, either small, or with a perennial stock of short duration. They are natives of Central and Southern Europe, Western Asia, as far as North-west India and Northern Africa; one species being also found in South Africa. Flowers green, small, granular, crowded in little axillary cymes. Leaves opposite. None of the species are of much interest from a horticultural point of view, and the only one worth mentioning here is *H. glabra*, which is sometimes used for carpet-bedding. For culture, *see* **Paronychia**.

H. glabra (glabrous). Rupturewort. *fl.* green, small. Summer. *l.* small, opposite, oblong-obovate, or rarely orbicular. Stems much branched, spread along the ground to the length of a few inches. Europe (Britain), North and West Asia. (Sy. En. B. 1171.)

HERON'S BILL. A general name for the British species of *Erodium* and *Geranium*.

HERPESTIS (from *herpestes*, anything that creeps; in allusion to the habit of the species). ORD. *Scrophularineæ*. This genus comprises about fifty species of erect, diffuse, prostrate, or aquatic perennial herbs, natives of various parts of America, Africa, Australia, or Southern Asia, few of which are in cultivation. Flowers axillary, sessile or pedicellate, one to three together. Leaves opposite entire, toothed, or in the aquatic species submerged, capillaceous-multisect. Increased by divisions, or by seeds. The species described below will grow in any loamy, well-drained soil, which must be kept constantly moist.

H. Monniera (Monnier's). *fl.* pale blue, small, solitary, opposite, on long pedicels. Summer. *l.* cuneiform, entire, or toothed at the apex. Tropics. Stove. (B. M. 2557.)

H. reflexa (reflexed). A garden name for **Myriophyllum proserpinacoides** (which *see*).

HERRANIA (named in honour of General Herran, a President of the Republic of New Grenada). ORD. *Sterculiaceæ*. A genus comprising three or four species of greenhouse evergreen trees, with palm-like heads, natives of tropical America. Flowers fasciculate, growing directly from the trunk. Leaves digitate, five or six-foliolate. Few of the species are yet in cultivation. For culture, *see* **Sterculia**.

H. albiflora (white-flowered). *fl.* white, the thick concave petals terminated by a long strap-shaped appendage. *l.* palmate, clothed with rusty-coloured hairs. Shrub. The seeds of this plant are said to be mixed with those of the Cacao, and the product thereby improved.

HERRERIA (named in honour of Gabriel A. de Herrera, 1470-1539, a Spanish agriculturist). ORD. *Liliaceæ*. A genus comprising three or four species of pretty greenhouse plants. Flowers small, scented, in many-flowered axillary racemes. Leaves whorl-fascicled, linear-lanceolate. Stems climbing. Rootstock tuberous. Herrerias succeed in peat, sand, and loam, mixed. Increased by seeds, or by cuttings. Probably the only species in cultivation is the following:

H. Sarsaparilla (Sarsaparilla). *fl.* green, yellow; segments of perianth ovate-obtuse. June and July. *l.* lanceolate. *h.* 8ft. Brazil, 1824. (B. R. 1042, under name of *H. parviflora*.)

HESIODA. *See* **Heisteria.**

HESPERANTHA (from *hesperos*, the evening, and *anthos*, a flower). Evening Flower. ORD. *Irideæ*. A genus of about twenty species of rather pretty dwarf greenhouse bulbous plants, natives of tropical and Southern Africa. Flowers very sweetly scented, opening in the evening (whence the common name), in loose spikes; perianth salver-shaped; limb equalling the slender tube; segments equal, spreading. Leaves sword-shaped, curled. For culture, *see* **Ixia** (to which this genus is allied).

H. angusta (narrow). *fl.* uniform white. Spring. *l.* narrower than those of *H. falcata*.

H. cinnamomea (Cinnamon-scented). *fl.* whitish. April and May. *l.*, radical ones falcate, curled. *h.* 6in. 1787. (B. M. 1054.)

H. falcata (sickle-shaped). *fl.*, outer perianth segments shining brown outside; inner segments and inside of outer ones pure white. April. *l.* 3in. to 12in. long, striated, somewhat sickle-shaped. *h.* 6in. to 12in. (B. M. 566, under name of *Ixia falcata*.)

H. graminifolia (grass-leaved). *fl.* greenish-white. August and September. *l.* linear. Stem smooth. *h.* 6in. 1808. (B. M. 1254, under name of *H. pilosa nuda*.)

H. pilosa (pilose). *fl.* whitish; inner segments pure white; outer white within, specked with red outside. April and May. *l.* linear, hairy. Stem smooth. *h.* 6in. 1811. (B. M. 1475.)

H. radiata (rayed).* *fl.* white within, nodding; outer segments striped with reddish-brown. April to June. *l.* fistulous. *h.* 6in. 1794. (B. M. 573, under name of *Ixia radiata*.)

HESPERIS (the old Greek name used by Theophrastus, from *hesperos*, the evening; in reference to the flowers of most of the species being sweet-scented in the evening). Dame's Violet; Rocket. ORD. *Cruciferæ*. A genus comprising twenty species of pretty hardy or half-hardy biennial or perennial erect herbs, indigenous to Europe, Asia Minor, Persia, and Siberia. Flowers various-coloured, loosely racemose, ebracteate, sweet-scented. Leaves ovate or oblong, entire, dentate, or lyrate. Only a few of the twenty species constituting this genus are cultivated; and of these the double forms of *H. matronalis* are by far the best. They thrive in

Hesperis—*continued.*

a somewhat moist sandy loam. The single sorts may be increased freely by seeds; the double forms must be propagated by careful divisions of the roots, or by cuttings. The three species described below are hardy.

H. grandiflora (large-flowered).* *fl.*, racemes many-flowered, crowded. *l.*, radical ones oblong-ovate, obtuse; cauline ones lanceolate. Native country unknown. (B. M. 2683.)

H. matronalis (matronly).* Damask Violet; Dame's Rocket; Dame's Violet; Common Rocket. *fl.* various, usually sweet-scented in the evening. Summer. *l.* shortly stalked or tapering at the base, ovate-lanceolate or lanceolate. *h.* 2ft. to 3ft. South Europe and all across Russian Asia. (Sy. En. B. 103.) There are numerous double and single varieties of this handsome perennial, all of which are very ornamental border plants.

H. tristis (sad).* Night-scented Stock. *fl.* whitish or cream-coloured, or brownish-red or dark purple, fragrant at night; pedicels very long. Spring and summer. *l.*, radical ones stalked, upper ones sessile, ovate, acute, entire or toothed, 2in. to 4in. long. Stem much branched at the top. *h.* 1ft. to 2ft. Eastern Europe, &c., 1629. Biennial. This should be grown on old walls, ruins, and such like places, where the seeds may be sown in crevices, &c. (B. M. 730.)

HESPEROSCORDON LACTEUM. A synonym of **Brodiæa lactea** (which *see*).

HESSEA (so called in honour of Paul Hesse, a botanical traveller). Including *Imhofia*. SYN. *Periphanes*. ORD. *Amaryllideæ*. A genus comprising about four or five species of greenhouse bulbs, from the Cape of Good Hope. Umbels many-flowered; scape solid. Leaves linear or subulate. For culture, *see* **Strumaria**.

H. crispa (curled).* *fl.* pink; umbels many-flowered; perianth segments wavy, flat. April to August. *l.* filiform, straight. *h.* 3in. 1790. (B. M. 1363, under name of *Strumaria crispa*.)

H. filifolia (thread-leaved). *fl.* white; perianth segments acute. November. *l.* filiform. *h.* 6in. 1774. SYN. *Imhofia filifolia*. (B. R. 440, under name of *Strumaria filifolia*.)

H. gemmata (twin). *fl.* pale yellow; perianth segments wavy, channelled; peduncles very long; scape flexuose. August. *l.* lanceolate, ciliate. *h.* 1ft. 1812. (B. M. 1620, under name of *Strumaria gemmata*.)

H. stellaris (starry). *fl.* pink; perianth segments spreading alternately, bearding beneath the ends. October and November. *l.* linear-acute, entire. *h.* 6in. 1794. SYNS. *Amaryllis stellaris*, *Strumaria stellaris*.

HETERANTHERA (from *heteros*, variable, and *anther*; the anthers are variable). ORD. *Pontederaceæ*. A genus containing about eight species of ornamental aquatic perennial herbs, one of which is tropical African, and all the rest American. Flowers blue or white, small, produced from a spathe in the axil of a sheathing leaf-stalk; perianth salver-shaped, with a long, slender tube, and a spreading, six-lobed limb. Leaves roundish, long-stalked or linear. *H. limosa* may be grown by the sides of a pond or rivulet. The remainder require the same treatment as other tender aquatics.

H. limosa (bog).* *fl.*, perianth tube slender; limb bright violet-blue; segments linear-oblong, obtuse; peduncles one-flowered. From May onwards. *l.* erect, from orbicular-ovate to almost lanceolate, obtuse, pale bright green on both surfaces, striated with numerous veins; petiole 6in. to 10in. long, stout, fistular. America (in bogs and marshes), widely distributed. Half-hardy. (B. M. 6192.)

H. reniformis (kidney-shaped). Mud Plantain. *fl.* white. July. *l.* roundish, kidney-shaped. South America, 1824. Greenhouse.

HETEROCENTRON. A synonym of **Heeria** (which *see*).

HETEROCHÆTA. Now included under *Aster* and *Erigeron*.

HETEROGAMOUS. When, in a flower-head, the florets of the ray are either neuter or female, and those of the disk male.

HETEROLOMA. *See* **Desmodium.**

HETEROMELES ARBUTIFOLIA. A synonym of **Photinia arbutifolia** (which *see*).

HETERONOMA. A synonym of **Arthrostemma** (which *see*).

HETEROPAPPUS (from *heteros*, dissimilar, and *pappos*, down; in reference to the pappus of the ray and disk florets being different). ORD. *Compositæ*. A genus comprising about four species of erect hardy herbs, natives of Japan, Formosa, or Mandschuria; closely allied to *Aster*. Flower-heads rather large or medium, loosely and irregularly panicled, or solitary at the apices of the branches; corolla rays white or bluish. Leaves alternate, entire or largely dentate. For culture, *see* **Aster.**

H. decipiens (deceptive). *fl.-heads* large; ray purple, disk yellow. Autumn. *l.* oblong-linear, acute. Mandschuria, 1863. (R. G. 425.)

H. hispidus (hairy).* *fl.-heads* white; scales of the involucre oblong-imbricated. September. *l.* oblong-lanceolate, scabrous, ciliated; lower ones ovate. Stem hispid; branches one-headed. *h.* 1ft. China and Japan, 1804. SYN. *Aster hispidus*.

HETEROPTERYS (from *heteros*, various, and *pteron*, a wing; in allusion to the various forms of the winged samaræ). ORD. *Malpighiaceæ*. A genus comprising about eighty species of ornamental stove shrubs, rarely climbing, natives of tropical, or rarely extra-tropical, South America, and a few Western tropical African. Flowers small, very often paniculate or racemose. Leaves opposite, and, for the most part, entire, usually glandular beneath; petioles short; stipules inconspicuous. The two species described below are stove climbers, closely allied to **Banisteria** (which *see* for cultivation).

H. chrysophylla (golden-leaved). *fl.*, corolla orange-coloured, becoming deeper and almost red in age; peduncles axillary, bearing an umbellate panicle. March. *l.* opposite, oval or oval-oblong, entire, somewhat acute and waved, coriaceous, dark green and glabrous above, and clothed with a golden-brown satiny pubescence beneath. Brazil, 1833. (B. M. 3237.)

H. purpurea (purple). *fl.* purple; racemes axillary and terminal, few-flowered. *l.* oval, smooth, glaucous beneath. Tropical America, 1759.

HETEROS. This, in Greek compounds, signifies variable, various.

HETEROSPATHE (from *heteros*, variable, and *spathe*, a spathe; alluding to the inequality in the size of the spathes). ORD. *Palmeæ*. A monotypic genus, the species being an elegant stove palm, with a graceful spreading habit, and remarkable for the length of the tapered segments of its pinnate fronds. It thrives in rich sandy loam and leaf mould, and may be increased by imported seeds.

H. elata (tall).* *l.* pinnatisect; leaflets ¾in. broad, with somewhat wider intervals between them, bright green on both surfaces, narrowing upwards into a long, slender, tapering point. Stems smooth. Amboyna, 1880. SYN. *Metroxylon elatum*, of gardens.

HETEROTHECA (from *heteros*, variable, and *theca*, a sheath; in reference to the shape of the achenes). SYNS. *Calycium* and *Diplocoma*. ORD. *Compositæ*. A genus of hairy or glabrous, erect, hardy or half-hardy herbs. Seven species have been enumerated (which may probably be reduced to about five), natives of North America and Mexico. *H. inuloides*—probably the only one in cultivation—is a pretty plant, adapted for culture in ordinary garden soil, but requires protection in winter. Propagated by seeds, or by divisions.

H. inuloides (Inula-like). *fl.* yellow, large; involucre many-leaved, closely imbricate, villosely hairy; receptacle honey-combed; corymbs loosely spreading, branched; peduncles very hairy. Summer. *l.* ovate-oblong, entire, hairy on both sides and fringed at the margins; root ones ovate, obtuse, bluntly toothed; stem ones sessile, somewhat amplexicaul, variable in shape. Stems 1ft. to 1½ft. high. Mexico, 1826. (S. B. F. G. 246, under name of *Diplocoma villosa*.)

HETEROTOMA (from *heteros*, variable, and *tome*, a cut; corolla unequally cut). ORD. *Campanulaceæ*. A genus containing four species of annual or perennial herbs, natives of Mexico. Flowers pedunculate, in terminal racemes; corolla blue or golden. Leaves alternate, petiolate. The species here described—perhaps the only one yet in general cultivation—is a very ornamental greenhouse or half-hardy plant. For culture, *see* half-hardy species of **Lobelia.**

Heterotoma—*continued.*

H. lobelioides (Lobelia-like).* Bird Plant. *fl.* purplish and yellow, racemose; corolla very curious, somewhat tubular, with a tapering base. *l.* broadly ovate, with distant teeth. Stem becoming woody at the base. Mexico, 1861. (F. d. S. 1454.)

HETEROTRICHUM. A synonym of **Saussurea** (which *see*).

HETEROTROPA (from *heteros*, various, and *trope*, a change; in allusion to the variable nature of the plants). ORD. *Aristolochiaceæ.* A small genus of greenhouse or half-hardy perennial herbs, with creeping roots, natives of Japan; now included, by Bentham and Hooker, under *Asarum.* Flowers terminal, solitary, shortly pedunculate; perianth dusky-purple or lurid; lobes acute or caudate-acuminate. Leaves long, petiolate, cordate-reniform or almost hastate. For culture, &c., *see* **Asarum.**

H. asaroides (Asarum-like). *fl.* inclined or drooping, on very short peduncles; perianth dull purplish-green, depresso-globose, contracted at base and mouth; limb of three triangular blunt segments, spreading horizontally; internal surface deeply cellular. April and May. *l.* petiolate, deeply cordate, nearly ovate, entire, spotted; petioles erect, as long as the leaves. Rhizome branched and nodose. *h.* 6in. 1836. Plant glabrous. Greenhouse. SYN. *Asarum japonicum.* (B. M. 4933.)

H. parviflora (small-flowered). *fl.* purple and green, solitary, bracteated, about half the size of those of *H. asaroides*; perianth urceolate; tube constricted above the middle, oval-ventricose below; segments of limb broadly ovate; bracts longer than the flowers. April. *l.* solitary, cordate, white-spotted, with a deep, narrow sinus. *h.* 3in. 1862. Greenhouse. (B. M. 5380.)

HEUCHERA (named after Johann Heinrich Heucher, 1677-1747, Professor of Medicine at Wittenburg). Alum Root. ORD. *Saxifrageæ.* This genus comprises about twenty species of elegant hardy perennial herbs, natives of temperate North America, from Mexico almost to the Arctic regions. Flowers rather small, spicate, racemose or paniculate, bracteate, glabrous or pubescent. Leaves radical, long-petiolate, broadly cordate or orbiculate, lobed or crenate. All the species are of easy culture in any ordinary garden soil, except stiff clay, and may be readily increased by dividing the crowns during spring. Most of the Heucheras have inconspicuous flowers, but *H. sanguinea* is one of the handsomest of recently-introduced herbaceous plants. All are worth growing on account of their foliage, but a couple of species will be sufficiently representative of the general character of the genus.

H. americana (American).* *fl.* reddish; thyrse elongated, panicled. Summer. *l.* on long petioles, somewhat five to seven-lobed, toothed. *h.* 1½ft. North America, 1656. Plant clothed with clammy pubescence.

H. caulescens (caulescent). A synonym of *H. villosa.*

H. cylindrica (cylindrical). *fl.* greenish, rather large; panicle compact, cylindrical. Summer. *l.* cordate, deeply and roundly lobed, crenated, ciliated, truncate at the base. *h.* 1ft. to 1½ft. Oregon, &c., 1830. (B. R. 1924.)

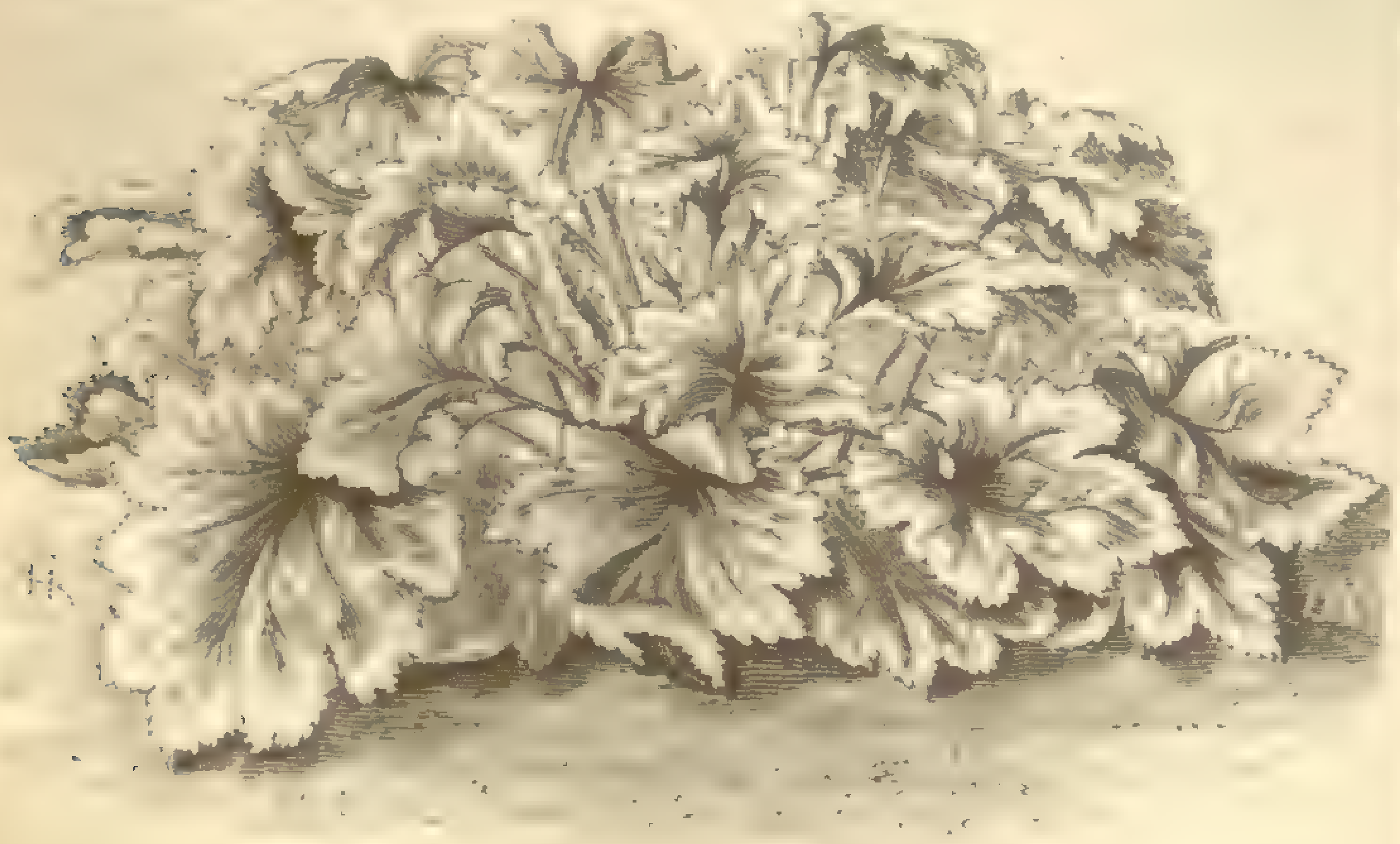


FIG. 223. HEUCHERA GLABRA.

H. glabra (glabrous). *fl.* white, small; panicle loose. Summer. *l.* cordate, acutely lobed, glabrous, unequally and acutely toothed; lower stem ones or bracts toothed. *h.* 1ft. North-west America, 1827. See Fig. 223. (H. F. B. A. i. 79.)

Heuchera—*continued.*

H. hispida (hispid).* *fl.* veined with purple, more or less oblique; stamens soon exserted, longer than the spathulate petals; panicles very narrow; scapes 2ft. to 4ft. high. May to July. *l.* rounded, slightly five to nine-lobed. High mountains of Virginia and Carolina, 1826. Plant hispid or hirsute, with long spreading hairs (occasionally almost glabrous), scarcely glandular. SYN. *H. Richardsonii.*

H. Menziesii (Menzies'). A synonym of *Tolmiea Menziesii.*

H. micrantha (small-flowered). *fl.* yellowish; panicle loose. Summer. *l.* roundish-cordate, nearly naked, bluntly lobed, crenate; teeth horned. *h.* 2ft. North-west America, 1827. (B. R. 1302.)

H. pubescens (downy). *fl.* pale red, variegated with yellow, large; branches of panicle short, crowded with flowers. Summer. *l.* somewhat acutely lobed, toothed; teeth mucronate. *h.* 1ft. United States, 1812. Plant covered with powdery down. SYNS. *H. pulverulenta, H. ribifolia.*

H. pulverulenta (powdery). A synonym of *H. pubescens.*

H. ribifolia (Currant-leaved). A synonym of *H. pubescens.*

H. Richardsonii (Richardson's). A synonym of *H. hispida.*

H. sanguinea (blood-coloured).* *fl.* deep red, paniculate, somewhat campanulate. Summer. *l.* cordate, orbiculate, five to seven-lobed; lobes dentate, ciliate; petioles clothed with spreading hairs. *h.* 9in. to 18in. Northern Mexico, 1882. (Gn. xxvi. 360.)

H. villosa (villous). *fl.* violet, small, loosely panicled; petals spathulate-linear, about as long as the stamens, soon twisted; scapes 1ft. to 3ft. high, villous, with rusty hairs (as are also the petioles and veins of the leaves beneath). August and September. *l.* acutely seven to nine-lobed. United States and Canada, 1812. SYN. *H. caulescens.*

HEVEA (from *Hevé*, a vernacular name in Northern South America). SYNS. *Micrandra, Siphonia.* ORD. *Euphorbiaceæ.* A genus comprising nine species of tall stove trees, natives of the damp forests of tropical America. Flowers in dichotomous cymes. Leaves alternate, on long petioles, digitately five-foliolate; leaflets petiolulate, entire. Of the two or three species yet introduced, the best-known is the one here described. It succeeds in a sandy loam. Propagated by cuttings, made of half-ripened wood, and inserted in sand, under a hand glass, in heat.

H. braziliensis (Brazilian). *fl.* green, white. May. *l.* light green, digitately trifoliolate. *h.* 60ft. Tropical South America, 1823. This plant furnishes the well-known Para rubber of commerce.

HEWARDIA. Now included under *Adiantum.*

HEXACENTRIS. This genus is now included, by the authors of the "Genera Plantarum," under **Thunbergia** (which *see*).

HEXAGLOTTIS (from *hex*, six, and *glotta*, a tongue; in reference to the six spreading lobes of the style). ORD. *Irideæ.* A genus of two or three species of pretty greenhouse bulbous plants, from South Africa, rarely seen in cultivation. For culture, *see* **Ixia.**

H. longifolia (long-leaved). *fl.* yellow; segments nearly equal, oblong, spreading; filaments united in a cylinder. May. *h.* 1½ft. 1766. SYNS. *Homeria* and *Moræa flexuosa.* (B. M. 695, under name of *Moræa flexuosa.*)

H. virgata (twiggy). *fl.* yellow. May. *h.* 2ft. 1825.

HEXAGONAL. Six-sided.

HIBBERTIA (named after George Hibbert, a distinguished patron of botany, who died in 1838). Including *Cyclandra, Hemistemma,* and *Pleurandra.* ORD. *Dilleniaceæ.* A genus of about seventy species of stove or greenhouse shrubs or under-shrubs, of which two are from Madagascar, three or four from New Caledonia, and the rest from Australia. Flowers yellow or white, solitary and terminal, or apparently axillary, sessile, in a tuft of floral leaves, or pedunculate. Leaves entire, or rarely largely or remotely dentate, often Heath-like, one-nerved or obscurely reticulate, penniveined. Hibbertias grow freely in peat or loam, either together or separate; a sufficient quantity of sand must, however, at all times be added, to maintain the soil in a healthy, porous condition. The pruning of weak and straggling shoots will need attention. If insects appear, they must be eradicated at once, or they will soon cause the plants to become both unhealthy and unsightly. Propagation may

Hibbertia—*continued.*

be effected by cuttings, inserted in sandy peat, under a bell glass. The commonest and most useful species is *H. dentata.* The undermentioned species require greenhouse treatment, except where otherwise stated.

H. Baudouinii (Baudouin's). *fl.* secund, sub-sessile, 2in. in diameter; sepals green, oblong, concave, apiculate; petals bright yellow, obovate-cuneate, retuse; racemes axillary, equalling the leaves, stout, sub-recurved. Summer. *l.* crowded towards the ends of the branches, 1ft. long, sessile, narrow-lanceolate, acuminate, entire or minutely serrulate. Stem grooved. New Caledonia. A small stove shrub. (B. M. 6053.)

H. crenata (crenate). A synonym of *H. grossulariæfolia.*

H. Cunninghamii (Cunningham's). *fl.* yellow; sepals thin, broadly ovate, the outer ones more acute; petals slightly notched; peduncles axillary. July. *l.* linear, mostly pointed; the edges scarcely recurved, narrowed below the middle, but expanded again into a stem-clasping or sagittate base. *Branches slender.* Western Australia, 1832. (B. M. 3183.)

FIG. 224. FLOWERING BRANCH OF HIBBERTIA PERFOLIATA.

H. dentata (toothed).* *fl.* dark yellow, 1½in. to 2in. in diameter, solitary, axillary. Spring and summer. *l.* oblong, acuminated, smooth, serrated, awned. 1814. Climber. (B. M. 2338.)

H. grossulariæfolia (Gooseberry-leaved). *fl.* yellow, rather small, on filiform peduncles; sepals ovate or lanceolate, acuminate; petals obovate, entire, or nearly so. May. *l.* distinctly petiolate, ovate or oval-oblong, obtuse, undulate and coarsely toothed, prominently pinnate, veined underneath, glabrous or scabrous above, *more or less pubescent or hairy beneath.* Stems weak and prostrate, or trailing, loosely pubescent. Western Australia, 1816. SYNS. *H. crenata* (A. B. R. 472; B. M. 1218), *H. latifolia.*

H. latifolia (broad-leaved). A synonym of *H. grossulariæfolia.*

Hibbertia—*continued.*

H. pedunculata (pedunculate). *fl.*, sepals ovate, very obtuse, usually minutely pubescent outside; petals obovate, slightly emarginate. *l.* narrow-linear, rigid, obtuse; margins revolute, numerous, but not clustered. Stems diffuse, prostrate, or rarely erect. New South Wales. There is a variety, *corifolia*, figured in B. M. 2672.

H. perfoliata (perfoliate).* *fl.* pale yellow. Summer. *l.* ovate, acute, edged with minute distant teeth, perfoliate near the base. Stem shortly trailing, procumbent or erect. West Australia. See Fig. 224. (B. R. 1843, 64.)

H. stricta (upright).* *fl.* bright yellow, small, profusely produced, solitary, axillary, and terminal. *l.* linear. Australia. A wiry and much-branching species. There are several forms.

H. volubilis (twining). *fl.* rather fœtid, sessile, the largest of the genus. Summer. *l.* obovate-lanceolate, nearly entire, mucronate, 3in. to 4in. long. Stems twining. Queensland and New South Wales, 1790. (A. B. R. 126.)

HIBISCUS (the old Greek name for the Marsh Mallow, used by Dioscorides). Including *Lagunæa, Pa-*

FIG. 225. FLOWERING BRANCH OF HIBISCUS COCCINEUS.

ritium, and *Trionum.* ORD. *Malvaceæ.* An extensive genus, comprising about 150 species of stove, greenhouse,

Hibiscus—*continued.*

or hardy herbs, shrubs, or trees, natives, for the most part, of tropical regions, but occurring also in temperate ones. Flowers variable in colour, and usually showy. Leaves variable, often partite.

Cultivation. Stove or warm greenhouse species of Hibiscus succeed best either in large pots or when planted out. A compost of peat and fibry loam, not broken too finely, in about equal proportions, with the addition of a little charcoal or sand, will suit them admirably. Those grown for their flowers should be rested, and kept tolerably dry, throughout the winter. In spring, they require a little cutting in, and starting in a brisk, moist heat; afterwards applying plenty of heat and water throughout the summer. Some of the species, which succeed in a greenhouse all the summer, will require warmer quarters in winter. They are propagated from seed, and by cuttings, inserted in a close frame, in spring. *H. r.-s. Cooperi* is a free-growing plant, with ornamental foliage, requiring the same treatment in winter as other stove subjects. The hardy species succeed in ordinary garden soil, preferably in that which is sandy, and in a warm position. *H. Trionum* may be readily increased from seeds.

H. africanus (African). A synonym of *H. Trionum.*

H. Cameroni (Cameron's). *fl.* rosy; calyx large, inflated, five-lobed; petals obliquely cuneate-truncate, with a crimson blotch at the base of each. June and July. *l.* cordate, five-lobed, coarsely serrated; lobes acute, constricted at base. *h.* 1ft. Madagascar, 1837. Stove shrub. (B. M. 3936.)

H. coccineus (scarlet).* *fl.* bright scarlet. July and August. *l.* long-stalked, five-parted; lobes lanceolate, remotely toothed, with entire tips. *h.* 4ft. to 8ft. Marshes of Florida and Georgia. Greenhouse perennial. See Fig. 225. (B. M. 360, under name of *H. speciosus.*)

H. elatus (tall). *fl.* purplish-copper colour, large; peduncles very short, one-flowered; involucre ten-cleft. *l.* roundish-cordate, quite entire, downy-white beneath. *h.* 50ft. West Indies, 1790. Stove. "Cuba Bast" is formed from the inner bark of this tree. SYN. *Paritium elatum.*

H. ferox (fierce). *fl.* yellow; calyx pentagonal, hispid, inflated in front; peduncles axillary, twin, one-flowered. May to July. *l.* large, shining, cordate, five to seven-lobed, villous beneath; stipules cordate, acuminate. *h.* 3ft. New Grenada, 1844. A prickly stove shrub. (B. M. 4401.)

H. Huegelii quinquevulnerus (Baron Huegel's five spotted). A very handsome variety, with deep rose petals, paler below, and each petal having a black blood-coloured spot on the claw. August. Swan River, 1853. Greenhouse.

H. marmoratus (marbled).* *fl.* 2½in. long, and as wide across the petals; peduncles solitary, axillary, stiff, much longer than the petioles, articulate above the middle; calyx tubular-campanulate, five-cleft almost to the middle; petals white, reticulately mottled with bright rose-pink, longer than the calyx, convolute into a tube below, spreading above; staminal column slender, exserted. February. *l.* on rather short petioles, variable in shape, bluntly toothed, dark green on the upper surface, paler below, 3in. to 4in. long, 2in. to 4in. broad. Mexico, 1854. Greenhouse shrub. (B. M. 5702.)

H. militaris (military).* *fl.* rose-coloured; pedicels axillary, free from the petioles, one-flowered, and jointed above the middle. Summer. *l.* cordate, toothed, somewhat three-lobed, downy beneath. *h.* 2ft. to 4ft. United States. Hardy perennial. (B. M. 2385.)

H. Moscheutos (Moscheutos). *fl.* white, with a purplish centre, or sometimes pale purple, large; petioles and peduncles joined together; involucres and calyces downy. Summer. *l.* ovate, acuminated, serrated, downy beneath. *h.* 3ft. North America. Hardy. (S. B. F. G. 286.)

H. pedunculatus (pedunculate). *fl.* deep rosy-red, showy, campanulate; petals cuneate-oblong, rounded at the apex; involucre of about eight linear segments. *l.* three-lobed, the lobes blunt, with toothed margins. Stems hairy. Natal. *h.* 2ft. to 4ft. Greenhouse shrub. (B. R. 231.)

H. radiatus (rayed). *fl.* axillary, solitary, short-peduncled, very large; the exterior two-thirds of the petals yellow, and spreading horizontally; the inner third deep crimson, and formed into a bell. Summer. *l.* alternate, palmate, rarely simple; petioles armed, and nearly as long as the leaves. Branches armed with small prickles. India and Java. Stove shrub. *H. r. flore-purpureo* is a variety having fine rose-purple flowers. (B. M. 5098.) *H. Lindlei* (B. R. 1395), another with deep purple corollas.

H. rosa-sinensis (Chinese Rose).* *fl.* varied in colouration, large, single, semi or wholly double; pedicels length of leaves; involucre seven-leaved. Summer. *l.* ovate, acuminated, smooth, entire at the base, but coarsely toothed at the apex. Stem unarmed, arboreous. *h.* 10ft. to 15ft. China, Japan, &c., 1731;

Hibiscus—*continued.*

FIG. 226. FLOWERING BRANCH OF HIBISCUS ROSA-SINENSIS.

cultivated for ornament throughout all tropical regions. Stove. See Fig. 226. Of the numerous varieties in cultivation, the following are the most noteworthy and desirable.

H. r.-s. brilliantissimum (very brilliant). *fl.* 5½in. across, spreading, almost flat, but having a short funnel-shaped base, formed by the convergence of the bases of the petals, which are in that part stained with a deeper crimson, and overlapping each other so that they form a circular flower.

H. r.-s. Callerii (Caller's). *fl.* buff-yellow, with a crimson-scarlet base. A very distinct and remarkable variety, with general character and habit of type.

H. r.-s. Cooperi (Cooper's).* *fl.* scarlet. *l.* irregularly ovate-lanceolate, cuneate at the base, bluntly serrated, vivid green, splashed and blotched with dark olive-green, creamy-white, and crimson, and margined with a broad and irregularly feathery border of reddish-carmine.

H. r.-s. fulgidus (shining).* *fl.* 5in. in diameter, of fine broad, rounded, and beautifully undulated petals, of an intense carmine-scarlet, paler and somewhat rosy tinted towards the base, where on each petal is an oblong blotch of deep crimson. *l.* broadly-ovate, serrated.

FIG. 227. FLOWERING BRANCH OF HIBISCUS ROSEUS.

Hibiscus—*continued.*

H. r.-s. miniatus semi-plenus (half-double vermilion). *fl.* vermilion-scarlet, semi-double; petals very much waved and recurved, forming an irregular undulated mass 4in. across. *l.* leathery, ovate, coarsely toothed.

H. r.-s. vivicans (lively). *fl.* brilliant crimson-scarlet, 4in. to 5in. in diameter, the centre being completely filled up with broad, convolute petaloid processes.

H. r.-s. zebrinus (zebra-striped). *fl.* about 3½in. in diameter, and 2½in. deep, double; the five outer petals scarlet, edged with creamy-yellow in the lower part; staminal column entirely petaloid, with numerous irregular tufts at the apex, of a creamy-yellow colour, variously and irregularly striped and flaked with scarlet. The flowers are very irregular and grotesque in form.

H. roseus (rosy). *fl.* rose-coloured, large, axillary, solitary. *l.* large, broadly oval-acuminate, covered with white tomentum beneath. *h.* 3ft. Naturalised in marshy spots in France and elsewhere. Probably of New World origin. Hardy. See Fig. 227.

H. schizopetalus (cut-petaled).* *fl.* brilliant orange-red, pendulous, on slender peduncles; petals deeply cut or laciniated; the united filaments of the stamens closely surround the style, and the latter projects about 2in. beyond the corolla. A remarkable stove species. (B. M. 6524.)

H. speciosus (showy). A synonym of *H. coccineus.*

H. splendens (splendid). *fl.* rose-coloured, very large; pedicels as long as the petioles; calyx 1in. long, deeply divided, densely tomentose or hispid. May. *l.* on long petioles, broadly ovate-cordate, or palmately three or five-lobed, often 6in. or 7in. long; lobes oblong-acuminate or lanceolate, often narrowed at base. *h.* 12ft. to 20ft. Australia, 1828. A beautiful, densely tomentose greenhouse shrub; branches and petioles bristly or prickly. (B. M. 3025; B. R. 1629.)

FIG. 228. FLOWERING BRANCH OF HIBISCUS SYRIACUS.

H. syriacus (Syrian).* *fl.* varying much in colouration, large, single or double; pedicels hardly longer than the leaves; involucre six or seven-leaved. August. *l.* alternate, ovate, wedge-shaped, three-lobed, toothed. *h.* 6ft. Syria, 1596. Hardy deciduous shrub. See Fig. 228. SYN. *Althæa frutex.* The following are the most approved varieties: ALBO-LUTEOLUS PLENUS, ALBO-PLENUS, AMARANTHUS, AMPLISSIMUS, ANEMONÆFLORUS, ARDENS, BICOLOR HYBRIDUS, CARNEO-PLENUS, CŒLESTIS, CŒRULEUS PLENUS, DUC DE BRABANT, DUCHESSE DE BRABANT, ELEGANTISSIMUS, FASTUOSUS, LEOPOLDII, MONSTROSUS, POMPON ROUGE, PUNICEUS PLENUS, PURPUREUS VARIEGATUS, RANUNCULIFLORUS, ROSEUS PLENUS, RUBRUS PLENUS, SPECIOSUS RUBRUS, TOTUS ALBUS, VIOLACEUS ATROPURPUREUS FLORE-PLENISSIMO, VIOLACEUS VARIEGATUS, VIOLET CLAIR (double).

H. Trionum (Trionum). Bladder Ketmia. *fl.* yellow, with a purple centre. Summer. *l.* cordate, palmately lobed; lobes linear. *h.* 2ft. Africa. Hardy annual. See Fig. 229. SYN. *H. africanus.*

Hibiscus—*continued.*

FIG. 229. FLOWERING BRANCH OF HIBISCUS TRIONUM.

Varieties. The varieties of *H. rosa-sinensis* and *H. syriacus* are very beautiful, especially those of the former. For this reason, only a few of the typical species are seen in our gardens, and these are much inferior to the varieties.

HICKORY. *See* **Carya.**

HIERACIUM (the Greek name used by Dioscorides for another plant, from *hierax*, a hawk; application doubtful). Hawkweed. ORD. *Compositæ.* A genus, comprising about 150 species of hardy perennial herbs, from Europe, North Asia, and a few from America, very nearly allied to *Crepis.* Flower-heads yellow, or rarely orange-red; involucre more or less imbricated. Leaves entire or toothed. Comparatively few of the species of this extensive genus are worth growing. These are of very easy culture in any ordinary garden soil. Some of the British ones do well on old walls, and in such positions are very ornamental. Propagated by divisions, in spring; or by seeds.

H. aurantiacum (orange).* *fl.-heads* orange-red; corymb eight to ten-flowered; involucre covered with long hairs. June and July. *l.* elliptical, acute, entire. Stem often bearing one or two leaves at the bottom, hairy. *h.* 1ft. to 1½ft. Scandinavia to the Pyrenees (naturalised in North of England and Scotland). (Sy. En. B. 823.)

H. Pilosella (mouse-ear). *fl.-heads* lemon-coloured, often tinged with red on the outside; involucres and upper part of peduncle more or less clothed with minute and close whitish down, mixed with short, stiff, spreading black hairs. *l.* oblong or lanceolate, entire, tapering at the base and often stalked. Europe (Britain), North and West Asia, North Africa. (Sy. En. B. [illegible].)

HIEROCHLOE (from *hieros*, sacred, and *chloa*, grass; in the North of Europe, these grasses are strewn before church doors, on saints' days). Holy Grass. SYNS. *Disarrenum, Savastana, Torresia.* ORD. *Gramineæ.* A genus of about eight species of sweet-scented hardy perennial grasses, inhabiting the colder regions of both Northern and Southern hemispheres. Spikelets three-flowered, open-panicled; flowers all with two paleas; glumes equalling or exceeding the spikelet, scarious. Hierochloes grow freely in damp spots, in any ordinary garden soil. Propagated by seeds, which are abundantly produced.

H. alpina (alpine). *fl.*, panicle contracted, 1in. to 2in. long; one of the staminate flowers barely pointed, or short-awned near the tip, the other long-awned from below the middle. July. *l.*, lower ones very narrow. *h.* 1ft. Northern hemisphere (on alpine mountain tops), 1827.

H. borealis (Northern). *fl.*, spikelets chestnut-colour; staminate flowers strongly hairy-fringed on the margins, with the lower palea mucronate or bristle-pointed at or near the tip; panicle somewhat one-sided, pyramidal, 2in. to 5in. long; peduncles smooth. May. *l.* short, lanceolate. Culm 1ft. to 2ft. high. Rootstock creeping. Northern hemisphere (Caithness).

HIGGINSIA. A synonym of **Hoffmannia** (which *see*).

HILLIA (named after Sir John Hill, 1716-1775, a celebrated botanical author). SYNS. *Fereiria, Saldanha.* ORD. *Rubiaceæ.* A genus comprising about five species of ornamental stove evergreen shrubs, natives of tropical America and the West Indian Islands. Flowers white, large, terminal, solitary, sub-sessile, bracteate and bracteolate. Leaves opposite, shortly petiolate, fleshy; stipules intrapetiolar, membranaceous, caducous. For culture, *see* **Cinchona.**

H. longiflora (long-flowered). *fl.* white, very fragrant; tube long; corolla with six twisted segments. February. *l.* ovate. *h.* 2ft. West Indies, &c., 1789. (B. M. 721.) *H. tetrandra* is an allied species.

HILUM. The scar produced by the separation of a seed from its placenta.

HINDSIA (named after R. Brinsley Hinds, the botanist of the "Sulphur" Expedition). SYN. *Macrosiphon.* ORD. *Rubiaceæ.* A genus comprising about three species of small ornamental stove evergreen shrubs, natives of Brazil. Flowers violaceous, rather large, in terminal cymes, sessile; pedicels short, bracteolate. Leaves petiolate, ovate, or ovate-lanceolate. For culture, *see* **Rondeletia.**

H. longiflora (long-flowered). *fl.* blue; panicle leafy, branches three-flowered. May. *l.* ovate-lanceolate, strigose beneath. *h.* 2ft. 1841. (B. M. 3977, under name of *Rondeletia longiflora.*) There is a white-flowered form.

H. violacea (violet).* *fl.* elegant ultramarine, disposed in clusters 2in. long. May. *l.* broad-ovate. *h.* 3ft. 1844. Plant downy. (B. M. 4135.)

HIPPEASTRUM (from *hippeus*, a knight, and *astron*, a star; referring to the shape of *H. equestre*). Equestrian Star. ORD. *Amaryllideæ.* A genus of upwards of fifty species of tunicated bulbous plants, natives

FIG. 230. HYBRID HIPPEASTRUMS.

of tropical and extra-tropical South America. Perianth funnel-shaped, more or less declinate; scape fistulose, two or many-flowered. In most catalogues, the plants described below are classed under *Amaryllis.* Few subjects are more gorgeous and attractive, in winter

Hippeastrum—*continued.*

and spring, than several of the species of *Hippeastrum*, and the numerous beautiful hybrids (see Fig. 230) that have been obtained therefrom by the skill and persevering labours of the hybridist. Some of the flowers are of the richest deep crimson and blood-red; others are nearly white, or are striped, mottled, and blended, in a most effective manner, with a combination of colours. Distinct species and hybrids have been crossed and intercrossed, until breadth of petal, size, substance, and perfect form of flowers, have been attained far beyond the most sanguine expectations of the hybridisers themselves. When once established, and of sufficient size, the flowering of the bulbs annually is almost certain; they do not require much space, and their general culture is easy. Propagation is readily effected by seeds for raising new varieties, and this method is also largely practised for producing bulbs to flower for ordinary decoration. Named species or varieties are perpetuated by offsets, which spring up from the base of established bulbs.

Seeds should be sown, as soon as ripe, in well-drained pots or pans of sandy loam, slightly covered, and placed in a temperature of about 65deg. When the seedlings are large enough to handle, pot off into very small pots, taking care not to insert too deeply, and afterwards plunge in bottom heat. If kept in a moist atmosphere, with a temperature ranging from 60deg. to 70deg., the young plants make rapid progress.

Offsets. For increasing by offsets, it is necessary to take the old bulbs from the pots, and carefully separate with the least possible injury to the roots. The latter become much interlaced, and do not like disturbance; consequently, it should not be resorted to more than is requisite. It is best to leave them until several offsets are formed, as the latter increase in size faster when attached to the parent plant, and the necessity of frequently disturbing the roots is avoided. The operation should be performed when the plants are at rest. Offsets should be placed singly in pots, but must on no account be overpotted, as they do not succeed in a quantity of soil, which is liable to become soured before being penetrated with roots. Keep the bulb about two-thirds above the level of the soil, dispose the roots evenly, and afterwards plunge in bottom heat, in a position exposed to light.

Cultivation. Hippeastrums are more or less evergreen, and, although they require a season of rest, water should never be entirely withheld. The growing season is from early spring, after flowering is over, until about September, when the plants should be kept cool and allowed to rest until February. They may then be placed in a minimum temperature of about 60deg., and more water and syringings applied. If the bulbs are large enough, and have been well matured, the flower scapes will soon appear, usually a little in advance of the leaves. Young bulbs should be repotted, if they require it, just when starting, shaking out some of the old soil, well filling in the new amongst the roots, and making it quite firm with a hand rammer. Established flowering bulbs in 7in., or larger pots in the case of extra-sized specimens, should have a top-dressing each year when starting; this being generally sufficient for them, with the aid of manure water in the growing season. Rather heavy, loamy soil should be used, with the addition of some charcoal and crushed bones, and good drainage is very important. Hippeastrums require plenty of light and sunshine, except during the flowering period, when a light shading will tend to preserve the blossoms. In some large nurseries, special houses are now devoted to their accommodation. They are made with a span-roof, thus insuring plenty of light. The pots are plunged level in beds of tan or cocoanut fibre, and a magnificent display is made by the plants when

Hippeastrum—*continued.*

flowering in a mass about the month of April. Plenty of air and water may be administered in summer, taking care to get them thoroughly ripened by autumn, when the pots, with their contents, may be stored and kept in a moderately dry, cool house until starting time the following year.

H. Ackermanni (Ackermann's).* *fl.* crimson, handsome, very large. Stove. The parent of many of the large-flowering varieties. One of the best of these is *pulcherrima*, which has a deep crimson throat, very handsomely streaked with green.

H. Alberti (Albert's). *fl.* orange-red, yellowish towards the base of each petal, full double, about 6in. across. Cuba, 1867. A very handsome variety, probably merely a double form of *H. equestre.* Stove. (I. H. 1866, 498.)

H. ambiguum (ambiguous). *fl.*, perianth tubulose; segments striated with red within; throat softly bearded. *l.* broad, strap-shaped, full green. *h.* 2ft. Lima, 1836. A very handsome plant. (B. M. 3542.)

H. aulicum (courtly).* *fl.* large, extremely handsome; petals unequal, obovate, sharply acuminated, patent, striated, within of a rich crimson, green at the base, and above the green is a dark blotch of red-purple; scape rounded, glabrous, 1ft. to 1½ft. high. *l.* broadly strap-shaped, full green, not at all glaucous, closely striated; the apex rather obtuse. *h.* 1½ft. to 2ft. Rio Janeiro. Greenhouse. SYN. *Amaryllis aulica.* (B. M. 2983, 3311.)

H. breviflorum (short-flowered). *fl.* scentless; perianth white, striated; externally slightly tinged with yellow-green, and marked with a central broad, red streak; within, the same red streak is separated by a white line down the middle; scape rounded, glaucous. April. *l.*, spathe of two lanceolate, membranous leaflets. *h.* 3ft. Buenos Ayres, 1836. Stove. (B. M. 3549.)

H. equestre (equestrian).* Barbados Lily. *fl.* orange-green. West Indies, Guiana, Chili, &c., 1810. Stove. (B. M. 305.) There are several very handsome forms of this old species, including the following: *fulgida*, bright orange, margined white; *major*, large, bright orange, with green central star; *flore-pleno*, rich orange, quite double; and *ignescens*, bright light scarlet, with a white throat, which runs out in bars to the centre of the segments. (R. G. 1874, 150.)

H. Johnsoni (Johnson's). *fl.* dull red, with a white stripe down each segment. One of the earliest hybrids; a specially hardy and robust grower, and a very abundant blossomer.

H. miniatum (scarlet). *fl.* red; umbel two to five-flowered; perianth campanulate; limb six-parted, thrice longer than the tube; scape very smooth, rather longer than the leaves. July. *h.* 1ft. Chili, 1832. Stove. (S. B. F. G. ser. ii. 213, under name of *Habranthus miniatus.*)

H. pardinum (leopard-spotted).* *fl.* upwards of 6in. in diameter, very spreading, with scarcely any tube; ground colour rich cream, profusely dotted all over with crimson. Peru, 1866. A splendid greenhouse species. (B. M. 5645.)

H. pratense (meadow). *fl.* brightest scarlet, sometimes feathered with yellow at the base; disposed in umbels on stems about 1ft. high. Chili, 1840. Nearly hardy. This is closely allied to *H. fulgens.* SYN. *Amaryllis pratensis.* (B. R. 1842, 35, under name of *Habranthus pratensis.*)

H. psittacinum (parrot-like). *fl.* green and scarlet. It is unique and beautiful, and has been fruitful in seedlings. (B. M. 3528.)

H. pulverulentum (powdery). *fl.* red, four, ringent, with taper-pointed segments; scape about 2ft., purple at the bottom. April and May. *l.* deep green, conspicuously covered with a cinereous bloom, purple at their base. *h.* 2ft. Brazil, 1819. Stove. (B. M. 2273, under name of *Amaryllis pulverulenta.*)

H. pyrrochroum (flame-coloured). *fl.* deep red, good size, four or five on a scape; throat shading to greenish-yellow. Para, 1863. Stove. (I. H. 1864, 420.)

H. reticulatum (netted).* *fl.* a beautiful soft pink and white, about 3in. in diameter; veins darker, and giving the whole flower an interesting netted appearance; scape five or six-flowered. *l.* dark green, with a pure ivory-white midrib. Brazil, 1677. Stove. (B. M. 2113.)

H. solandriflorum (Solandra-flowered). *fl.* drooping, very large; perianth tube very long, slender, pale green; limb somewhat spreading; segments oblong, rather acute, dingy sulphur, or cream-coloured, greenish at the middle of the back; scape terete. May. *l.* rather narrow, ligulate, keeled below, blunt at the apex, about 1ft. long. *h.* 2ft. Guiana, 1839. Stove. (B. M. 2573, 3771.)

H. stylosum (long-styled). *fl.*, limb pale fulvous-pink, veined and speckled with a deeper colour; anthers straw-coloured, striped with red; pollen bright yellow; style 1¼in. longer than corolla. *l.* like those of *H. equestre*, but more glossy, and purple at their base. *h.* 2ft. Brazil, 1821. Stove. (B. M. 2278.)

H. sub-barbatum (slightly-bearded). "This beautiful plant, from Rio Janeiro, occupies an intermediate place between *H. fulgidum* and *H. equestre major*, to which last it approximates in the colour and form of the limb, the shape of the star, and the vestige of a beard, which is just distinguishable at the mouth of the tube." Stove. (B. M. 2475.)

Hippeastrum—*continued.*

H. vittata (striped).* *fl.* clear white, with double red stripes on each perianth-segment. One of the most beautiful species; it has proved the most fruitful parent of many of the finest varieties. Greenhouse. (B. M. 129.)

HIPPIA (from *hippos*, a horse; application doubtful). ORD. *Compositæ.* This genus comprises four species of slender greenhouse herbs or branching sub-shrubs, all natives of South Africa. Flower-heads yellow, minute, rayless, something like those of the Chamomile. Leaves alternate, pinnatifid or pinnatisect, rarely entire. Hippias thrive in a peat and loam compost. Propagated by cuttings, or by seeds.

H. frutescens (shrubby). *fl.-heads* yellow, corymbose. February to August. *l.* pinnatifid. *h.* 6in. 1710. Plant shrubby, villous. (B. M. 1855.)

HIPPION. A synonym of **Gentiana** (which *see*).

HIPPOBROMUS (from *hippos*, a horse, and *bromos*, a bad smell; reason for name not given by its author). It is the Paardepis of the Dutch colonists. ORD. *Sapindaceæ.* A monotypic genus, the species being a greenhouse resin-bearing tree of considerable size. It thrives in sandy loam. Propagated by cuttings, inserted in sand, under a hand glass.

H. alatus (winged). *fl.* reddish, small, from the axils of the leaves, regular, polygamous; sepals persistent, rotundate, concave, unequal, broadly imbricate; petals five, obovate, glabrous. *l.* alternate, exstipulate, abruptly pinnate; leaflets sessile, sub-opposite, dentate, serrate, or entire. South Africa.

HIPPOCASTANEÆ. Included under *Sapindaceæ.*

HIPPOCENTAUREA. A synonym of **Erythræa** (which *see*).

HIPPOCRATEACEÆ. A tribe of *Celastrineæ.*

HIPPOCREPIFORM. Horseshoe-shaped.

HIPPOCREPIS (from *hippos*, a horse, and *krepis* a shoe; in allusion to the shape of the pod). Horseshoe Vetch. ORD. *Leguminosæ.* A genus comprising about twelve species of pretty, usually hardy, herbs or low shrubs, inhabitants of Europe, North Africa, and Western Asia. Flowers yellow, nodding, honeyed; peduncles axillary. Leaves impari-pinnate; leaflets entire, exstipellate. The species are of very easy culture in ordinary garden soil, and may be increased by division of the root, or by seeds. *H. balearica* requires greenhouse or frame protection in winter, and thrives in a peat and loam soil.

H. balearica (Balearic). *fl.*, peduncles longer than the leaves, bearing an umbel of flowers at the apex. Summer. *h.* 1ft. to 2ft. Minorca, 1776. Plant shrubby, erect, half-hardy. (B. M. 427.)

H. comosa (tufted). *fl.* disposed similar to those of *H. balearica.* Spring and summer. *l.*, leaflets seven to eleven, obovate, obtuse. Stem herbaceous, prostrate. South and West Europe (Britain), North Africa. (Sy. En. B. 380.)

HIPPOMANE (from *Hippomanes*, the old Greek name for a kind of spurge, used by Theophrastus, and meaning, literally, mad after horses; referring to its effect on mares). SYN. *Mancinella.* ORD. *Euphorbiaceæ.* A monotypic genus, the species being a tall, milk-bearing, very poisonous tree. It thrives in a mixture of sandy loam and peat. Propagated by cuttings, inserted in sand, under a glass, in heat.

H. Mancinella (Manchineel). Manchineel-tree. *fl.* small, inconspicuous, and of separate sexes. May. *fr.* a roundish, fleshy, yellowish-green berry. *l.* stalked, shining green, egg-shaped or elliptical, with the edges cut into saw like teeth, having a single gland on the upper side, at the junction of the stalk and leaf. *h.* 40ft. to 50ft. West Indies, Central America, 1690. (R. G. 510.)

HIPPOPHAE (from *Hippophaes*, the old Greek name for a prickly spurge, used by Hippocrates). Sallow Thorn; Sea Buckthorn. ORD. *Elæagnaceæ.* A hardy deciduous shrub. It is of easy culture in common garden soil, and is especially useful for growing near the sea-coast. Propagated by layers, by suckers, by cuttings of the roots, or by seeds.

H. rhamnoides (Rhamnus-like).* *fl.* yellow, diœcious, axillary, pedunculate, small. May. Berries of a bright orange-colour,

Hippophae—*continued.*

l. linear-lanceolate, bluntish, dotted, silvery beneath. Branches ending in a spine. *h.* 2ft. to 20ft. Europe (England), North and Central Asia, Himalaya. *H. salicifolia*, the Himalayan form of the species, is hardly different from the one which is found on the English coasts. (Sy. En. B. 1245.)

HIPPURIS (the old Greek name used by Dioscorides, from *hippos*, a horse, and *oura*, a tail; in allusion to the resemblance of the stem to a horse's tail). ORD. *Halorageæ*. A genus comprising one or two species of glabrous aquatic herbs, natives of Europe, Central and Northern Asia, North and Antarctic America. *H. vulgaris* is the only species which calls for special mention. It is a perennial, and thrives in a bog, pond, or marshy situation. Propagated by division of the roots, or by seeds.

H. vulgaris (common). Common Marestail. *fl.* greenish, minute; anthers red. Summer. *l.* linear, strap-shaped, entire. Stems simple, erect; upper part projecting out of the water sometimes to the height of 8in. or 10in., crowded by whorls of from eight to twelve leaves. Europe (Britain), Asia, &c. (Sy. En. B. 516.)

HIRSUTE. Clothed with somewhat soft hairs.

HISPID. Covered with rather stiff hairs.

HOARY. Covered with grey or whitish hairs, not readily distinguished by the naked eye.

HODGSONIA (named after B. H. Hodgson, F.L.S.). ORD. *Cucurbitaceæ*. A genus consisting of only one (or perhaps two) species. *H. heteroclita* is a remarkable shrub, native of Eastern Bengal and the Malay Archipelago. It requires an almost tropical heat and damp in summer, but not in winter, when it ought to be kept more cool and dry. It has not yet flowered in this country. Propagated from imported seeds, or by cuttings, inserted in sandy soil, under a bell glass, in bottom heat.

H. heteroclita (anomalous). *fl.* yellow outside, white within, large, with long filiform twisted appendages hanging from their lobes; very deciduous. May. *fr.* large, melon-like. *l.* persistent, coriaceous, palmately lobed; lobes entire. The stems are described by Sir Joseph Hooker as slender, frequently 100ft. long, climbing the forest trees, and having their branching ends matted together, and covered with leaves, which sometimes form a dense hanging screen of bright green foliage. (C. H. P. 1, 2, 3.)

HOES and HOEING. There are numerous forms and varieties of Hoes adapted for use, according to the special purpose for which any are required, and the condition or nature of the soil, whether light or heavy. They are indispensable garden implements for drawing

FIG. 231. SWAN-NECKED DRAW HOE.

drills for seeds, thinning and cleaning crops, breaking the surface of the soil, earthing up, &c. The principal forms are the Draw Hoe and the Dutch or Thrust Hoe, both of which are manufactured in many widths. Draw Hoes were originally all made with a short neck, and a circular eye for fixing the handle in. In using these, the soil

FIG. 232. TRIANGULAR HOE.

gets much clogged on and around the eye. A great improvement, which prevents this clogging considerably, has now been effected by the almost general use of the shape known as the Swan-necked (see Fig. 231). In these, the handle is inserted in a socket, which is con-

Hoes and Hoeing—*continued.*

nected with the blade by a curved solid neck. The blade should be made of steel plates, welded on iron necks. This process was previously thought impossible, or at least difficult, but is now readily accomplished. The width of the plate varies from 2in. to 9in. in the different sizes. Hoes with a flat triangular head, and three points (see Fig. 232), are sometimes used for making

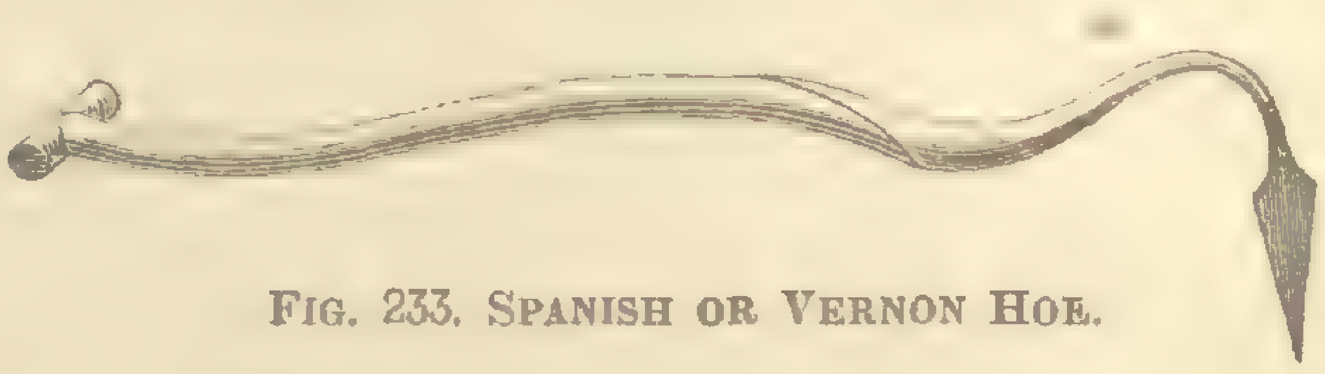


FIG. 233. SPANISH OR VERNON HOE.

drills; and the Spanish or Vernon Hoe (see Fig. 233) is a form with only one point. Dutch Hoes (see Fig. 234) are very useful for destroying weeds, or for loosening the surface, where the soil is not too stiff or wet.

FIG. 234. DUTCH HOE.

A workman, in using the Dutch Hoe, walks backwards, and, consequently, does not tread on the ground after it is finished, as he does with the Draw Hoe. A combination Draw Hoe, or Mattock and Fork, sometimes termed

FIG. 235. DRAW HOE AND FORK COMBINED.

a Pickfork, is shown in Fig. 235. It is very useful for loosening and breaking hard lumps of soil, and the forked part is frequently utilised with advantage in unloading manure. Another and stronger form of a similar descrip-

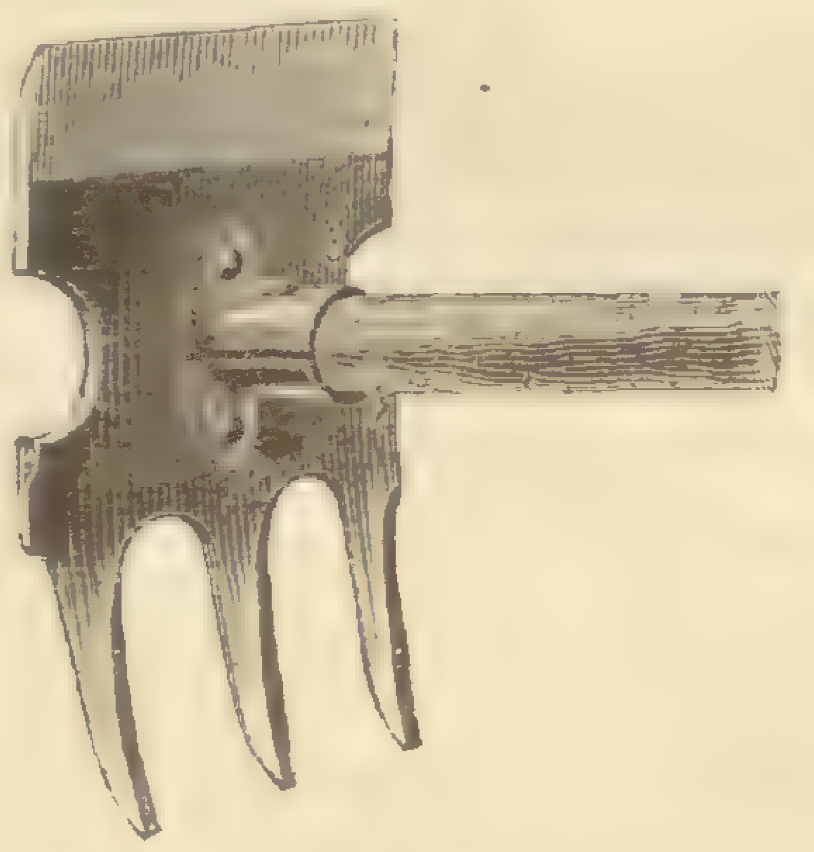


FIG. 236. DRAG HOE OR PICKFORK.

tion is represented in Fig. 236. Hoeing forms a considerable portion of routine work in gardens. Nearly all crops are much benefited by the surface soil being kept loose; and large numbers of seedling weeds are destroyed, at the same time, by running the Hoe through in dry weather. The thinning of crops is much practised with Draw Hoes. It should only be entrusted to workmen who understand the use of the implement, as, otherwise, many plants will be cut up that should have remained.

HOFFMANNIA (named after G. F. Hoffmann, 1761-1826, Professor of Botany at Gottingen, &c.). Including *Campylobotrys*. SYNS. *Higginsia*, *Ohigginsia*. ORD. *Rubiaceæ*. A genus comprising about twenty species of herbs or shrubs, natives of tropical America. Flowers white, yellow, or red, small, in axillary, few-flowered, occasionally unilateral, pedunculate or sub-sessile cymes. Leaves opposite, or two to four-nate, verticillate; stipules interpetiolar, small, broadly triangular or transversely oblong-linear, deciduous. Hoffmannias will thrive in the open air in summer, if planted in sandy soil; but they require the protection of a greenhouse in winter. Propagated by cuttings, inserted in sandy soil, under a bell glass, in bottom heat.

Hoffmannia—*continued.*

H. pedunculata (pedunculate). *fl.*, corolla yellow, and variegated with red, rotate; racemes few to eight-flowered, peduncled; peduncles as long as, or exceeding, the petiole. *l.* elliptical, pointed, cuneate at the long-petioled base, glabrescent above, rusty-pilose, with scattered down beneath. *h.* 2ft. to 3ft. Jamaica (in mountain woods).

H. refulgens (shining).* *fl.* pale red, upwards of 1in. across, in solitary cymes; corolla lobes much longer than the tube; peduncles solitary, axillary, erect, purple-red, shorter than the leaves. May. *l.* 3in. to 5in. long, narrow-obovate, sub-acute, contracted at base, but not petioled; upper surface dull green, suffused with red, especially towards the margins; under surface pale reddish. Branches purple, erect. *h.* 1ft. to 2ft. South America. (B. M. 5346, under name of *Higginsia refulgens.*)

H. regalis (royal). *fl.* aggregate, sub-sessile, unattractive. August. *l.* roundly-ovate, acuminate, entire, sub-coriaceous, plicato-penninerved, glabrous, shining dark green above, reddish-purple beneath; stipules triangular, deciduous. Branches sub-succulent, obtuse, tetragonal. *h.* 1ft. Mexico, 1859. A robust stove shrub. (B. M. 5280, under name of *Higginsia regalis.*)

HOG PLUM. *See* **Spondias.**

HOHENBERGIA. Now included under **Æchmea** (which *see*).

HOITZIA. A synonym of **Lœselia** (which *see*).

HOLBŒLLIA (named after Fred. Louis Holböll, once Superintendent of the Botanic Garden at Copenhagen). A monotypic genus, the species being an interesting conservatory or cool greenhouse evergreen climbing shrub. It is of easy culture in any light soil. Propagation is effected by cuttings, made of half-ripened shoots, in spring.

FIG. 237. *HOLBŒLLIA LATIFOLIA*, showing Flowering Branch and detached Female Flowers.

H. discolor (two-coloured).* This species "is remarkable for the lurid-green yet satiny surface or velvety gloss of the upper side of the leaves, and the rich red-purple tints of the branches and under side of the foliage, and the still more pronounced red colour of the peduncles and flowers and teeth of the calyx" (Sir W. J. Hooker). *h.* 6in. Mexico, 1850. Stove. (B. M. 4530, under name of *Campylobotrys discolor.*)

H. Ghiesbreghtii (Ghiesbreght's).* *fl.* yellow, spotted red on the disk, inconspicuous; cymes on short axillary peduncles. *l.* large, 1ft. or more long, broad oblong-lanceolate, acuminate, entire, much decurrent and attenuated at the base, so as to be perfoliate, strongly penninerved and sub-plicate; upper surface rich dark velvety-green above, very slightly pubescent; under surface dull purple-red, veins very prominent. Branches green, herbaceous, elongated. *h.* 2ft. to 4ft. South America, 1861. (B. M. 5383, under name of *Higginsia Gheisbechtii.*) *variegata* is a form with leaves blotched with creamy-white, yellow, and red.

H. latifolia (broad-leaved). *fl.* purple or greenish, very fragrant; racemes axillary, corymbose; peduncles longer than petioles. March. *l.* ternate or quinate, coriaceous; leaflets oblong, obtuse, mucronate. *h.* 20ft. Himalaya, 1840. See Fig. 237. (B. R. 1846, 49.) *H. l. angustifolia* is a form having seven to nine linear-lanceolate leaflets.

HOLCUS (*Holkos*, the old Greek name of a grass). Soft Grass. ORD. *Gramineæ*. A genus of eight species of annual or perennial grasses, natives of Europe, temperate Asia, North and South Africa. Panicles loose; spikelets compressed, two-flowered. The species are of easy culture in ordinary soil. The only one worth growing is the following:

H. lanatus albo-variegatus (woolly, white-variegated). *l.* soft, pubescent, with a broad central and narrow green stripes,

Holcus—*continued.*

the intermediate spaces and margin of a clear silvery-white. A well-marked, variegated perennial plant, forming a very neat tuft.

HOLLY. *See* **Ilex.**

HOLLYHOCK (*Althæa rosea*). The Hollyhock is a very old inhabitant of our gardens, and, where it succeeds, is one of the finest autumnal flowers for the decoration of our gardens and shrubberies. Of recent years, the Hollyhock disease has played such havoc amongst the plants, that their cultivation has become a matter of extreme uncertainty, and has, consequently, been somewhat neglected. At one time, not long since, the Hollyhock was considered an important florists' and exhibition flower, splendid double varieties having been selected and raised by some few hybridisers, who devoted special attention to its improvement. Propagation is effected by seeds, by cuttings, and by divisions; also sometimes by eyes, obtained from side shoots when they are getting firm, in July or August, and placed in light soil, under a shaded hand glass. Seeds should be saved from the finest sorts, and sown, so soon as ripe, in pots or pans, being placed in a slight bottom heat,

FIG. 238. FLOWERING STEM OF HOLLYHOCK.

Hollyhock—*continued.*

or in the open air, in June or July. The seedlings should be transferred, in either case, when large enough, into 3in. pots, and wintered in a cold frame. This method is adopted to obtain new varieties, and for securing a large number of plants for ordinary decoration. The usual mode of propagation is by cuttings, about 3in. long, consisting of young shoots, which may be taken off close to the old root, at nearly any time of the year. They should be placed singly in small pots of light sandy soil, and kept close and shaded in a cold frame until roots are emitted. If propagation by cuttings is practised in winter, a gentle bottom heat should be given them. Division of the roots may be effected, after flowering is over, by separating the crown, so as to preserve one or more buds, and as many roots as possible, to each piece. Cuttings are generally preferred to divisions, but either plan will answer.

Outdoor Cultivation. Hollyhocks succeed—if they are not attacked by the disease—in almost any good garden soil. If in any way poor, it should be previously well trenched and manured, or strong spikes will not be obtained. The young plants should be wintered near the glass in cold frames, admitting plenty of air and giving only a little water. They must not be allowed to become starved for want of root-room when young. Gradually harden off in March, and plant out, about the middle of April, where they are intended to flower. A few for late flowering may be planted a month later. Space of about 3ft. every way will not be too much between the plants. They should be protected on cold nights until established, and be supplied with plenty of water throughout the summer. A top-dressing of well-decayed manure is beneficial when the flower-spikes are pushing up. Strong plants may be allowed two or three spikes, but the weaker kinds should be reduced to one by removing all the other side growths when young. A stiff stake will be requisite for each plant, and it should be inserted before injury is caused by rough wind. In a sunny position and good soil, Hollyhocks reach a height of 8ft. or 10ft., and flower from about 3ft. above the ground nearly to the points (see Fig. 238). After flowering is over, the spikes should be cut down to about 6in. from the base; and if the varieties are choice, they should be lifted before winter, and stored, like seedlings, &c., in frames. Where the soil is tolerably dry, and the winter not very severe, Hollyhocks keep all right in the open ground. Small pieces of choice sorts may also be grafted on roots obtained from vigorous seedlings.

Varieties. Good collections of Hollyhocks still exist, and, in some places, are successfully cultivated. Should the disease diminish its attacks, and allow of named varieties (of which the following is a good selection) being again generally grown, no doubt they will receive the attention they merit, both for general decoration and for exhibition. Seedlings, from good varieties, are much cultivated, and frequently answer their purpose equally as well as named sorts.

ACME (Chater), peach-colour, extra fine; ALBA SUPERBA, pure white, fine spike; BLACK GEM, glossy blackish-maroon, good; CARUS CHATER, reddish-crimson, very fine; COMPETITOR, deep rich purple, extra; CONQUEST, dark crimson; CONSTANCE, delicate pale flesh, with a dark base; CYGNET, pure white, large flowers and good spike; DECISION, puce, long close spike; DUCHESS, rosy-peach, good; EARL OF BREADALBANE, light red, fine full flower; ECLIPSE, bright rosy-red, extra fine; ELEANOR, soft pale rose, good; EMPEROR, dark crimson-maroon; GOLDEN DROP, bright deep yellow, large flower; JAMES MACDONALD, shining-red, fine spike; JESSIE DEAN, clear dark amber; JOSHUA CLARK, bright cherry, fine; LADY MIDDLETON, purple, very large flower; LILAC PERFECTION, pale lilac, good; MARVELLOUS, deep orange-buff, full; MISS ASHLEY, rose, fine spike; MODEL, light crimson; MR. CHATER, amber, tinged with crimson, full flower; MRS. EDWARDS, pure salmon, extra; MRS. ELLIOTT, white, shaded and tinged lilac; NELSON, light purple, large flower; OCTAVIA, rose-pink, very fine; PERFECTION, white, suffused reddish-salmon; PRINCESS, white, suffused salmon, large and

Hollyhock—*continued.*

fine; QUEEN OF WHITES, white, large flower, and fine spike; QUEEN OF YELLOWS, golden-yellow, large spike, extra; SCARLET GEM, bright scarlet; SULTAN, purple, large flower; W. BACKHOUSE, bright rose; W. THOMSON, purple, large flower and fine spike.

HOLLYHOCK FUNGUS (*Puccinia Malvacearum*). This fungus is met with on several species of the order *Malvaceæ*, but is particularly hurtful to the Hollyhock. It forms on the lower (seldom on the upper) surface of the leaves small raised spots, at first red-brown, but becoming darker. On the other side of the leaf, the spot is indicated by a discoloured mark. If the attack is severe, the leaves are destroyed, and the plants perish. On microscopic examination, the raised spots are found to be made up of spores of a Puccinia supported on very long hyaline pedicels. These spores are at first covered by the epiderm, but are exposed by bursting through it. This fungus is known only in the Puccinia form; and the spores have been found to germinate almost as soon as mature. The rapid germination explains, probably, the wide and speedy diffusion of the fungus in Europe, in the years 1873 and 1874. It is believed to be a native of Chili, from which country the types of the species were obtained by Montagne. In Europe, it was first observed as dangerous to Hollyhocks in 1873; though specimens were found in Spain as early as 1869. In the former year, it appeared, almost simultaneously, in France and in various places in England; and, in the autumn, in Germany also. Next year, it spread through Germany, Holland, Hungary, and parts of Italy. For a time, it proved most destructive to Hollyhocks; but, as has occurred with other parasitic fungi, its virulence has greatly abated in later years. The best means of treatment is to destroy all leaves as soon as they show signs of being attacked, and to prevent the growth of the other food-plants of the fungus in the neighbourhood of Hollyhocks.

HOLLY-LEAF FLY (*Phytomyza Ilicis*). Holly leaves are very often disfigured by irregular pale blotches on the upper surface. These are spaces mined in the green cellular tissue, and are the work of the larvæ of the Holly-leaf Fly. Usually, two or three larvæ are to be found in a leaf, each in its own mine. They are under a line in length, yellowish-white, with black mouth. The small, oval, brown-ringed pupæ may be found in the mine, covered by the lower epiderm of the leaf; and there they remain all winter, disclosing the flies in early summer of the next year. The fly is rather under one line long, black, with proboscis pale yellow, except the black palpi and hairs; knees and base of tibiæ paler; wings transparent, much longer than abdomen. The most successful way to destroy the insects seems to be the removal and burning of the mined leaves; but this is hardly necessary, except in very select varieties of the plants, since the mines do not appear to cause much injury, unless very numerous.

HOLLY, SEA. *See* **Eryngium maritimum.**

HOLM OAK. *See* **Quercus Ilex.**

HOLMSKIOLDIA (named after Theodor Holmskiold, 1732-1794, a Danish botanist). SYN. *Hastingia.* ORD. *Verbenaceæ.* This genus comprises three species of glabrous or hoary pubescent shrubs. Flowers in shortly-stalked, axillary cymes, or crowded at the tips of the shoots. Leaves opposite, entire or dentate. *H. sanguinea*, the only species yet introduced, is a stove evergreen shrub. It thrives in any light, rich soil. Cuttings root readily in sandy soil, under glass, in heat.

H. sanguinea (blood-coloured). *fl.* scarlet, [illegible] of a few two to four-flowered whorls; [illegible] campanulate; corolla with [illegible]. *l.* petiolate, ovate, acuminated, [illegible]. India, 1796. (B. R. 692.)

HOLOGYMNE. Now included under **Lasthenia** (which *see*).

HOLOSERICEOUS. Covered all over with silky down.

HOMALANTHUS (from *homalos*, smooth, and *anthos*, a flower). SYN. *Carumbium.* ORD. *Euphorbiaceæ.* A genus of seven or eight species of stove evergreen shrubs, natives of the Malayan Archipelago, the Pacific Islands, and Australia. Flowers unisexual, inconspicuous, in terminal racemes. Leaves entire, long-stalked. For culture, *see* stove species of **Euphorbia.**

H. fastuosus (proud). *fl.* greenish. *l.* peltate. Philippines, 1866.

H. polyandrum (many-stamened). *l.* alternate, broadly [illegible], rich vinous-purple beneath. Lord Howe's Island, 1870. A handsome, erect-growing shrubby plant, with a glabrous terete stem.

H. populifolia (Poplar-leaved). *fl.* white. August. *h.* [illegible] Australia, [illegible]. (B. M. [illegible], under name of *[illegible] populifolia.*)

HOMALIEÆ. A tribe of *Samydaceæ.*

HOMALOMENA (from *homalos*, flat, and *nema*, a filament; alluding to the shape of the stamens). Including *Curmeria.* SYN. *Homalonema.* ORD. *Aroideæ* [illegible]. A genus of about twenty species of very ornamental stove, herbaceous or shrubby, foliage plants, natives of Asia and tropical America. For culture, *see* **Caladium**.

H. peltata (peltate). *fl.*, spathe persistent [illegible], constricted in the middle, acuminate at the apex, [illegible] with greenish internally; spadix about the length of the [illegible], cream-coloured. *l.* about 24in. [illegible], pubescent, deeply cordately two-lobed; lobes rounded. *h.* [illegible] Columbia, [illegible]. (G. C. [illegible].)

H. picturata (painted). *fl.*, [illegible]. *l.* cordate, [illegible] marked along the midrib with a narrow silvery-white band. *h.* 4in. to 5in. Columbia, 1873. (R. G. 1877, 891.)

H. Roezlii (Roezl's).* *fl.*, spathe olive-brown outside, creamy within. *l.* on long petioles, [illegible], tapering at the base, not cordate, sparsely spotted with a few yellow blotches. *h.* 6in. Columbia, 1875. (G. C. 1874, 804, under name of *Curmeria Roezlii.*)

H. rubescens (reddish). A synonym of *H. rubra.*

H. rubra (red). *fl.*, spathe sub-cylindrical, convolute, reddish-purple without, whitish within. *l.* sagittate-cordate, dark green; under surface purplish; petiole deep red. *h.* 1ft. to 2ft. Java, 1870. SYN. *H. rubescens.*

H. Wallisii (Wallis's).* *fl.*, spathe about 3in. long, constricted in the middle, reddish; spadix red, nearly as long as the [illegible]. *l.* shortly stalked, slightly oblique, ovate-oblong, [illegible] slightly tapering at the base, abruptly acuminate [illegible], bordered with a white edge, [illegible] on the upper surface. [illegible] (B. M. 6571.)

H. Wendlandii (Wendland's). *l.* [illegible] long and 1ft. broad, upper [illegible] below; petioles 2½ft. long, [illegible].

HOMALONEMA. A synonym of **Homalomena** (which *see*).

HOMERIA [illegible]. A small genus of [illegible] greenhouse bulbs, allied to *Moræa*, natives of South Africa. Flowers usually orange-red, [illegible] or yellow, very showy, and enduring; scapes leafy, [illegible]. Leaves linear-ensiform. For culture, *see* **Ixia.**

H. aurantiaca [illegible]

H. collina [illegible]

H. elegans [illegible]

H. lineata [illegible]

HOMOGAMOUS. When all the florets of a capitulum, &c., are hermaphrodite.

HOMOGENEOUS. Having a uniform nature or composition.

HOMOGYNE (from *homos*, the same, similar, and *gyne*, female; so called from the similarity of the female flowers to the others). ORD. *Compositæ*. A small genus, comprising but three species of stemless, hardy herbs, natives of the mountains of Europe. Flower-heads white or purple; scapes one or two-headed, furnished with one or two distant leaves. Leaves radical, broad, cordate, angular or sinuato-dentate. The species thrive in any tolerably damp garden border.

H. alpina (alpine). *fl.-heads* light purple, discoid; scape one-flowered, nearly naked. March to May. *l.* reniform, toothed, smooth. *h.* 6in. Austria, 1710. (B. M. 84, under name of *Tussilago alpina*.)

H. discolor (two-coloured). *fl.-heads* inodorous; scape solitary, terete, purple, clothed with whitish wool. June and July. *l.* radical, sub-rotund, cordate at base, acutely crenulated, thick, firm; upper surface green, shining-glabrous, boldly nerved; under surface densely and shortly tomentose. *h.* 6in. Austria to Italy, 1633. (J. F. A. iii. 247, under name of *Tussilago discolor*.)

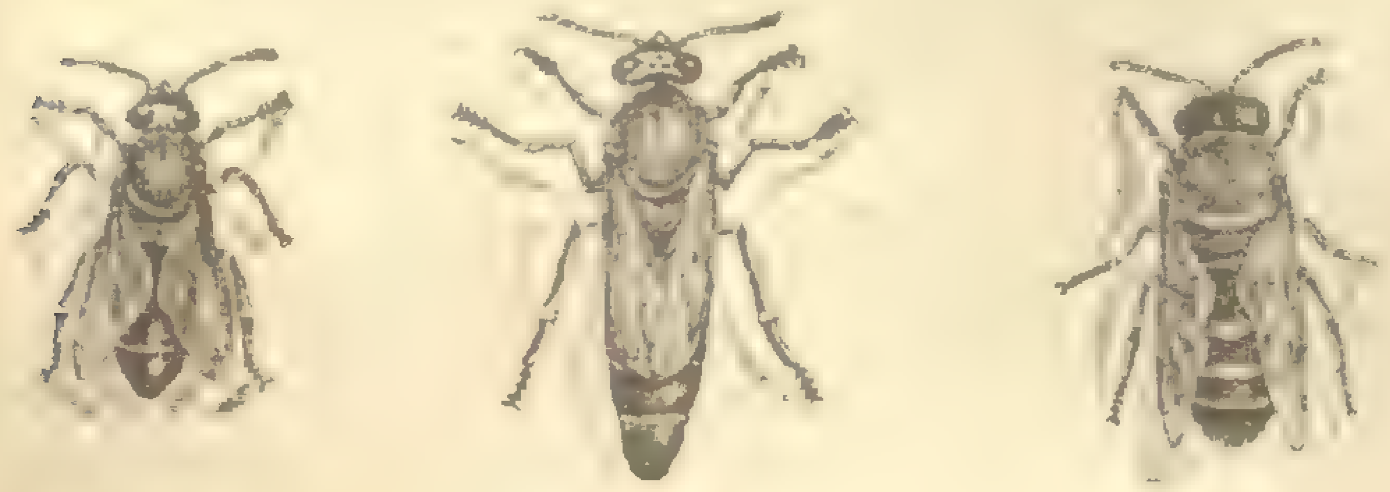
HOMOIANTHUS. Now included under **Perezia** (which *see*).

HONCKENYA (named after G. A. Honckeny, 1724-1805, author of a Flora of Germany). SYN. *Clappertonia*. ORD. *Tiliaceæ*. A monotypic genus. The species is a stellato-pubescent stove shrub, from tropical Africa. It thrives in a mixture of loam and peat. Propagated by young cuttings, inserted in sand, under a hand glass, in heat.

H. ficifolia (Fig-leaved). *fl.* bluish-violet, large, terminal, in threes. *l.* dentate, or three to seven-lobed.

HONESTY. *See* **Lunaria biennis.**

HONEY BEE (*Apis mellifica*). This is not the suitable occasion to give a full account of the structure and habits of the Honey Bee, or Hive Bee, and of its allies; but these insects are of such great value to horticulturists, because of the part they perform in the conveyance of pollen from flower to flower, and thereby securing the production of healthy seed, that they cannot be passed by in silence. Their habits, &c., will be again treated of under **Wasps** (which *see*), with which they agree in many of their social customs. The Bees form a numerous group of insects, with a considerable general similarity of aspect. All have the habit of making cells for the protection of the eggs and larvæ. The Solitary Bees form these cells either in galleries hollowed out by themselves, or in holes or nests, built by them of mud or



Worker. Queen. Drone.

FIG. 239. HONEY BEES.

other materials. The Humble Bees and Honey Bees build the cells of wax secreted from their bodies. They collect the pollen and the honey or nectar from flowers, and feed their larvæ on a mixture of these substances: hence, they have to make constant visits to flowers. The honey is also stored up in wax cells as food for their own use in winter. Among the Solitary Bees, only males and females can be distinguished, and the latter do all the work of providing for the larvæ. The Honey Bees comprise males or drones, perfect females or queens (usually one in each nest), and undeveloped females, called neuters or workers. The accompanying woodcuts (see Fig. 239), which were engraved from drawings made by Mr. Frank Cheshire, for his large work on Bee-keeping, show the relative sizes and forms of the three. After the queen is impregnated, the drones are killed by the workers.

Honey Bee—*continued.*

The queen's share in providing for the welfare of the community is restricted to laying eggs. On the workers falls all the work, viz., attending to the young brood, collecting food, and such-like duties. If, by any accident, the queen is lost, the workers can cause a worker-larva to develop into a queen, by supplying it with special food and enlarging the cell in which it lives. Returning now to the relation of Bees to flowers, we find that they are specially suited to remove the honey from flowers in which it is situated at the bottom of a tube of more than ¼in. long. The proboscis of the worker is formed of five pieces, of which the central piece (tongue) bears hairs near the tip, and is used to lick up the honey with. Flowers with honey at the bottom of narrow tubes, are specially attractive to Honey Bees, as in such it is beyond the reach of most other insects, and affords, therefore, a good supply to the Bees. To fit the workers for collecting the pollen, their hind legs have the middle joint (tibia) concave on one side, and furnished with rows of hairs, so placed as to retain the pollen, as in a shallow vessel. Certain flowers are of such a form that few other insects than Bees can reach the pollen or the nectar in them. Flowers adapted for fertilisation by Bees, *e.g.*, Antirrhinum, have the stamens and stigmas so situated that, in visiting the flowers, the insects must become dusted with the pollen, and it is conveyed to the stigma of the next flower of the same kind visited by them. Hence, they generally effect cross-fertilisation, the value of which, in the production of well-developed and healthy seeds, has been proved by experiment in many kinds of plants. (*See* Darwin's "Cross and Self-Fertilisation in the Vegetable Kingdom.") The Honey Bee seldom extracts the honey through holes bored in the flower tube, as the Humble Bee sometimes does, to the detriment of the flowers. On comparing the various kinds of Bees with the Honey Bee, the latter is found to be the most perfectly adapted of all the species for the collection of honey and pollen, and for insuring cross-fertilisation of the flowers it frequents to obtain these. Honey Bees usually restrict their visits more or less to one or two species of plant each day. Works that give much information on Bees are, among others: Huber's "New Observations on the Natural History of Bees," Kirby and Spence's "Introduction to Entomology," Bevan's "The Honey Bee," Shuckard's "British Bees," and Cheshire's "Bee-keeping: its Science and Practice."

HONEY BERRY. *See* **Melicocca bijuga.**

HONEYDEW. The name given to a sweet sticky substance, abundant on the leaves of many plants in summer, especially when the weather is warm and dry. It gives the parts on which it lies the appearance of being wet or varnished. Though it may occur on almost any parts of plants, it is most abundant on the leaves, where it is almost always restricted to the upper surface, covering it uniformly, or in the form of minute spots crowded on the spaces between the veins. It is more abundant on woody plants than on herbs. Various causes have been assigned for its production; the belief was at one time entertained that it fell from the air. Afterwards, it was observed that aphides and certain allied insects secreted a fluid similar in its qualities to Honeydew, and that this secretion became sprinkled over adjoining bodies; and it was suggested that these insects were the producers of the Honeydew. The fact that the substance covers the *upper* surface of the leaves, while the insects are almost always found on the lower surface, was accounted for by supposing that the secretion fell from the insects on to the leaves beneath. There is no doubt that this is one mode in which the Honeydew is produced; but it has frequently been observed that plants, both in the open air and in houses, have been much covered with the coating, when no insects could be found

Honeydew—*continued.*

on the plants, or in their neighbourhood. Sometimes, in such case, there is no appearance of disease in the leaves that bear it; but, at other times, they become discoloured, the green colouring matter, or chlorophyll, is destroyed below the shining patches, and the leaves may fall off early. Under these circumstances, the sweet fluid must be produced in, and exuded from, the cells of the leaves without any extraneous producer. Its production may, then, be regarded as analogous to the secretion of similar fluids in nectaries on various green parts of many healthy plants, *e.g.*, on the stipules of Beans; but, when carried to excess, it becomes a disease. The cause, or causes, of the change are still only conjectural; and so also are the means for preventing and curing attacks. Among grasses, Honeydew may be produced in yet a third way, viz., in the development of the Ergot Fungus (*Claviceps purpurea*), so plentiful, in many years, in the heads of numerous species of grasses. In the early stage, before the Ergot has yet become conspicuous in the ear, the fungus produces a body (*Sphacelia segetum*) that bears on its surface numerous spores, imbedded in a sticky fluid like Honeydew. When the fungus is very plentiful among grasses, this fluid is correspondingly abundant. It assists in the diffusion of the spores of the fungus, as flies are very fond of it, and visit the diseased plants, suck up the secretion, and carry it away, with spores imbedded in it, to other grasses, where the spores, in their turn, may propagate the species. The Honeydews of different plants probably vary a little in chemical composition; but all contain a considerable quantity of sugars, including Mannite and cane sugar. It is to these that the sweet taste is due. Plants covered with Honeydew, whatever its origin, are very attractive to insects, especially to flies, and, at night, to moths. Several kinds of fungi also find it very favourable for their development: hence, plants covered with it are apt to assume a sooty appearance, due to the growth in them of black or brown fungi (*Capnodium*, &c.). Particles of soot or dust are also apt to stick to the leaves. Such extraneous substances, along with the secretion itself, hinder the healthy processes in the leaf from being properly carried on, though the stomata, or breathing pores, usually escape being clogged, as they are more abundant on, if not confined to, the lower surface of the leaves, and this is not covered. The abundant exudation of sugars must also weaken the plants; but the effect is seldom dangerous—a fortunate circumstance, in our ignorance of methods of cure.

HONEY FLOWER. *See* **Melianthus.**

HONEY LOCUST. *See* **Gleditschia triacanthos.**

HONEYSUCKLE. *See* **Lonicera.**

HONEYSUCKLE, AFRICAN. *See* **Halleria lucida.**

HONEYWORT. *See* **Cerinthe.**

HOODED. The same as **Cucullate** (which *see*).

HOODIA (a commemorative name). SYNS. *Monothylaceum*, *Scytanthus*. ORD. *Asclepiadeæ*. A genus comprising three remarkable species of greenhouse succulent perennials, inhabiting Angola and South Africa. Flowers large, often solitary, shortly pedicellate; corolla rotate, with a very short tube, and a large, dilated, faintly five-lobed limb. Stems fleshy, many-angled, Cactus-like, thickly covered at the angles with strong prickles, which are dilated at the base. For culture, *see* **Stapelia.**

H. Bainii (Bain's). *fl.* produced near the apices of the branches, one to three together; calyx short, five-partite; segments acuminate; corolla pale buff-yellow, becoming purplish in decay, cup-shaped, about 3in. in diameter; margin with five recurved teeth, the apices of the obsolete lobes; corona double. July. Stems numerous from the crown, ashy-green, cylindric, leafless; younger portion with closely-set, spirally-arranged, laterally-compressed

Hoodia—*continued.*

tubercles, ultimately confluent into more or less marked prominent longitudinal ridges; tubercles tapering into a stout, sometimes deflexed, brown prickle. Karroo, 1875. (B. M. 6348.)

H. Gordoni (Gordon's). *fl.* produced near the apices of the branches, one to three together, shortly petiolate; calyx short, five-partite; corolla with a very short tube; lobes pale brownish flesh-coloured, glabrous. Stems numerous from the crown, erect or somewhat spreading, cylindric, slightly branched, leafless; younger portions with closely-set, spirally-arranged tubercles, each with a strong, slightly-deflexed prickle swollen at the base. Orange River, 1874. (B. M. 6228.)

HOOKERA. A synonym of **Brodiæa** (which *see*).

HOOP PETTICOAT. *See* **Narcissus Bulbocodium.**

HOP. *See* **Humulus Lupulus.**

HOP APHIS. *See* **Aphides.**

HOP FLEA. *See* **Turnip Fly.**

HOP HORNBEAM. *See* **Ostrya.**

HOPLOPHYTUM CALYCULATUM. *See* **Æchmea calyculata.**

HOPLOPHYTUM CŒLESTIS. *See* **Æchmea cœlestis.**

HORDEUM (the ancient Latin name). Barley. ORD. *Gramineæ*. A genus comprising about twelve species of valuable erect annual (or rarely perennial) grasses, natives of Europe, Northern Africa, temperate Asia, and extra-tropical America. Spikelets in threes, arranged on opposite sides of the rachis, hence forming a bilateral spike. Barley is, next to Wheat, the most important grain raised in this country. It is principally employed in the manufacture of fermented liquors and spirits. Tradition traces its culture back to remote antiquity, the Egyptians supposing it to be the first cerealea utilised by man. The principal species are: *H. distichon*, Long-eared Barley; *H. hexastichon*, Winter, or Square Barley; *H. vulgare*, Spring Barley; and *H. zeocriton*, the Sprat or Battledore Barley, a cultivated form of *H. distichon*. Probably the best species for horticultural purposes is *H. jubatum*, which thrives in any ordinary soil. Very little moisture is required. Seeds may be sown in the open ground.

FIG. 240. HORDEUM JUBATUM.

H. jubatum (bearded).* Squirrel-tail Grass. *fl.*, lateral ones abortive, on a short pedicel, short-awned; perfect flower bearing a capillary awn, 2in. long, all spreading. June. *h.* 2ft. North America, 1782. See Fig. 240.

HOREHOUND (*Marrubium vulgare*). A hardy herbaceous perennial, widely distributed throughout Europe and Northern Asia, and occasionally found wild in Britain.

Horehound—*continued.*

The product obtained by soaking the leaves and tops in boiling water, has long been a popular medicine for subduing irritating coughs, frequently proving effective when other and more valued remedies have failed. Horehound may be readily propagated by seeds, sown in March; by division of the roots, in spring; or by cuttings, inserted in a shady position outside. Plant about 15in. apart. Keep the ground clean between, and the roots will last several years. The annual growths may be cut when the flowers open, and dried in a cool shed, for use in winter.

HORKELIA. This genus is now included under **Potentilla** (which *see*).

HORMINUM (from *horminon*, the old Greek name given to a kind of Sage, by Dioscorides). ORD. *Labiatæ*. A monotypic genus. The species is an elegant hardy herbaceous perennial, thriving in an open border, in a well-drained situation. It is readily increased by dividing at the root, or by seed.

H. pyrenaicum (Pyrenean). *fl.* bluish-purple, nearly 1in. long, on short pedicels, nodding; whorls distant, six-flowered, secund. Summer. *l.* almost all radical, petiolate, ovate, obtuse, deeply crenated. *h.* 6in. to 12in. Pyrenees to Tyrol, 1820. (S. B. F. G. 252.)

HORNBEAM. *See* **Carpinus Betulus.**

HORNED POPPY. *See* **Glaucium.**

HORNEMANNIA. A synonym of **Mazus** (which *see*).

HORN MANURE. *See* **Manures.**

HORN OF PLENTY. The common name of **Fedia Cornucopiæ** (which *see*).

HORNY. Hard; of the consistence of horn.

HORSE BEAN. *See* **Faba vulgaris equina.**

HORSE CHESTNUT. *See* **Æsculus.**

HORSE-DUNG. The special use of Horse-dung by itself is for Mushroom culture. For this purpose, it is best suited if collected from stables where the horses have been fed chiefly on corn, hay, and other dry food. Horse-dung is of little use when medicine has lately been given to the horses, or when green grass has formed a large portion of their food. Stable litter is much to be preferred for hotbeds, when the whole of the droppings are left in it, as heat is thereby engendered, and the fermenting material much improved. Horse-dung is not so much used for making manure water as sheep, deer, or cow-dung; but that obtained from a large manure heap in wet weather is usually of good quality, and not very liable to burn or otherwise cause injury to plants. Horse-dung may be beneficially applied to cold, heavy soils. It may be used nearly fresh, and dug in with a portion of the litter as well. When not specially applied for rendering heavy soil lighter, but as a manure, it should be previously well turned, and moistened if any part is dry. When a heap is allowed to become very hot, it gets quite dry and white in the middle, the ammonia escapes, and the manure is comparatively worthless. Horse-dung may be used with good results as a top-dressing for producing an immediate action on growing crops.

HORSE-RADISH (*Cochlearia Armoracea*). A well-known hardy perennial, naturalised in Britain and many other countries, and widely cultivated in the temperate regions of the Old World, from the earliest historic periods, for the use of its roots, when scraped into fine shreds, for culinary purposes. Large quantities of roots are imported, but the best home-grown crops are much superior. It grows in almost any position, and is frequently neglected on that account. The best and tenderest roots are those grown on rich soil, which must be of good depth, and, preferably, in a rather moist situation. In private gardens, a large quantity is not usually required, as the roots that have been partly used keep fresh and good, in damp sand, for a long time. Any pieces of root form a crown, and this is the usual method of propagation. The aim should be to obtain roots as large as possible (see Fig. 241) before they are old enough to become hard. There are several methods of cultivation adopted by different growers for attaining this end, the following being considered amongst the most successful: Dig trenches from 2ft. to 3ft. deep, and, when filling them in, throw 15in. of the original top soil into the bottom; then place a layer of good manure over this, and dig it in, afterwards filling up the trench with the soil that was before in the bottom. When several trenches are being prepared, the first may be dug the full depth, and the soil from the one adjoining used as far as the trenches proceed. The object is to get the best soil down low, where the secondary or side roots are, and to have a poorer soil round the portion intended to be used. Some growers trench ground deeply, and make holes with a crowbar, about 1ft. apart, in rows, afterwards dropping a crown, with a portion of root attached, into the bottom. A large proportion succeed when treated in this way, and form straight roots in growing to the surface. Another successful method, which may, perhaps, be considered the best, is that adopted by some cultivators for market: Raised narrow beds are formed, somewhat like those for Asparagus, and any quantity of rich manure dug or trenched into them. In planting, straight roots, from 6in. to 9in. in length, are laid in a horizontal direction, about 1ft. apart, with the head, or crown part, to the outside edge, and covered with about 6in. of soil. The leaves from the crown turn and grow upright, and secondary roots grow from the main one downwards, and supply nourishment for enlarging it.

FIG. 241. HORSE-RADISH.

Horse-Radish—*continued.*

In digging the large roots for use, it is only necessary to insert the spade horizontally beneath them, and lift the whole out. The secondary roots then form an excellent stock for treating in a similar way. Horse-Radish should be allowed two or three years to develop, and a plantation should be made annually to keep a succession. All the side shoots surrounding the crown should be removed, except the strongest one, and the ground frequently hoed between the plants, in summer. Any portion of the root grows, and forms a crown, which sometimes renders the plant a nuisance.

HORSE-RADISH TREE. *See* **Moringa pterygosperma.**

HORSESHOE VETCH. *See* **Hippocrepis.**

HORSETAIL. *See* **Equisetum.**

HORSFIELDIA (named after Thomas Horsfield, 1773-1859, an American botanist). SYN. *Schubertia.* ORD. *Araliaceæ.* A genus comprising two species of tall stove evergreen prickly shrubs, natives of Java, only one of which has yet been introduced. Umbels capituliform, small; panicles sub-sessile. Leaves alternate, petiolate, cordate or peltate, three to five-lobed, or palmately five to nine-fid, tomentose or woolly beneath. For culture, *see* **Aralia.**

H. aculeata (prickly). *fl.* greenish-yellow; panicle terminal, densely clothed with stellate tomentum. *l.* cordate, five-lobed; upper ones three-lobed, covered with stellate tomentum beneath.

HORTENSIA. A synonym of **Hydrangea** (which *see*).

HORTENSIS. Of or belonging to a garden. The word is frequently contracted thus: hort.

HOSACKIA (named in honour of David Hosack, 1769-1835, once Professor of Botany in the University of New York). ORD. *Leguminosæ.* A genus comprising about twenty-five species of pretty dwarf hardy annual or perennial herbs, found in Oregon, California, Mexico, &c. Flowers yellow or reddish, usually disposed in umbels. Leaves impari-pinnate, or rarely trifoliolate. Hosackias are very rare in cultivation, but are well adapted for rockwork, and thrive in any ordinary garden soil. They may be easily increased by seeds, or by divisions.

H. bicolor (two-coloured). *fl.* six to ten in each umbel; standard and keel yellow; wings white. Summer. *l.* with seven to nine leaflets. *h.* 1½ft. North America, 1823. Perennial. SYN. *Lotus pinnatus* (under which name it is figured in B. M. 2913).

H. crassifolia (thick-leaved). *fl.*, umbels capitate, many-flowered, nodding; petals greenish, with chocolate-coloured middles. June. *l.* pinnate, with an odd one; leaflets opposite or alternate, ovate or oval, mucronulate; stipules herbaceous, ovate, acute. *h.* 3ft. California. Perennial. (B. R. 1977, under name of *H. stolonifera.*)

HOSTA (of Jacquin). A synonym of **Cornutia** (which *see*).

HOSTA (of Trattinick). A synonym of **Funkia** (which *see*).

HOTBEDS. These are composed of fermenting material, prepared for supplying heat to plants, either in frames or houses. They are also sometimes used for encouraging growth in tender plants or seedlings in the open air. When properly managed, Hotbeds are extremely useful, especially in spring, in supplying a moist, genial heat for propagating and growing-on all sorts of soft-wooded plants. Cuttings of the various bedding plants required in quantities emit roots and grow much faster on a Hotbed than when placed where there is only fire heat. In preparing fermenting material of the best quality, fresh stable litter should be secured and thoroughly mixed with an equal portion, or a larger quantity, of newly-collected leaves. If any part is dry, it should be well watered when mixing, and the whole heap turned over every alternate day for about a week. By this time, it

Hotbeds—*continued.*

will be ready for forming a Hotbed, by building a heap the shape of the frames to be used, and allowing an extra width of 3ft. all round; or for placing inside any permanent pit of sufficient depth. It is important that the whole should be firmly and evenly trodden, to insure against any one part settling together closer than another, and for securing a uniform heat throughout. All rank steam should be allowed to pass off before any plants are placed inside the frames, and shading should be applied during sunshine, if there is a danger of steam being present. It is well to allow a little ventilation at the top of the frames or pits, night and day, for a short time after beds are newly made up. Hotbeds made up on the surface of the ground, for propagating purposes, should not be less than 3ft. or 4ft. in thickness, apart from the necessary filling up of the frame with similar material. Stable litter, by itself, heats much too violently, and does not last long; when mixed with a good proportion of leaves, the heating properties are somewhat slower, but of a lasting description, and, consequently, much better suited to the requirements of plants. A layer of ashes or cocoa-nut fibre, placed over the surface, is extremely useful for plunging small pots.

HOTEIA JAPONICA. A synonym of **Astilbe japonica** (which *see*).

HOTTENTOT BREAD. *See* **Testudinaria Elephantipes.**

HOTTENTOT CHERRY. *See* **Cassine Maurocenia.**

HOTTENTOT FIG. *See* **Mesembryanthemum edule.**

HOTTONIA (named after P. Hotton, 1648-1709, a Dutch botanist, Professor at Leyden). ORD. *Primulaceæ.* A genus comprising two species of hardy perennial aquatic herbs, natives of Europe, North-west Asia, and North America. Flowers white or lilac, dimorphic, honeyed, in whorls, forming a terminal raceme. Leaves pinnatifid, submerged. *H. palustris*, the species usually seen under cultivation, is a handsome plant. It thrives in shallow ponds. Propagated by divisions, in spring; or by seeds, sown at the same season.

H. palustris (marsh).* Featherfoil; Water Violet. *fl.* lilac, with a yellow eye, similar in shape to the Primrose; whorls numerous. June. *l.* submerged, deeply pinnatifid, with linear segments. *h.* 1ft. to 2ft. Europe (Britain), West Siberia. (Sy. En. B. 1128.)

HOULLETIA (named after M. Houllet, a French gardener). ORD. *Orchideæ.* A genus of about half-a-dozen species of ornamental orchids, natives of Columbia and Brazil. Perianth spreading; sepals nearly free; petals a little smaller, unguiculate; lip continuous with the base of the column, which is erect, arched, and clavate. Houlletias thrive in pots, in a compost of peat and charcoal. Perfect drainage, and a liberal supply of water during the growing season, are needed. Propagation may be effected by divisions of the pseudo-bulbs, as growth commences.

H. Brocklehurstiana (Brocklehurst's). *fl.* 3in. to 3½in. in diameter; petals orange-brown, with darker spots; lip yellow, spotted with dark brown; spikes about six-flowered, from the sides of the short rounded pseudo-bulbs. Summer. *l.* broad, on long petioles, pale green. *h.* 1½ft. Brazil, 1841. (B. M. 4072.)

H. chrysantha (golden-flowered). *fl.* large, 1½in. broad; sepals and petals golden-yellow, profusely blotched with chocolate; lip rich yellow, freckled with crimson; spike from the base of the flask-shaped pseudo-bulbs, six to eight-flowered. *l.* solitary, narrow-elliptic, plaited. Columbia, 1872. (I. H. xviii. 138.)

H. Lowiana (Low's). *fl.* yellowish-white, about 1½in. across; peduncles usually bent forwards or sideways, one to three-flowered. *l.* cuneate, oblong-lanceolate, acute, plaited, unequal. Pseudo-bulbs very short, whitish-green. Columbia, 1874.

H. odoratissima (very sweet-scented).* *fl.* 2½in. across; petals orange-brown, striped with a lighter colour; lip white, tipped with yellow; spike from the side of the pseudo-bulbs. *l.* light green. *h.* 1½ft.

Houlletia—*continued.*

H. o. antioquensis (Antioquian). *fl.*, sepals much broader than those of the type; lip very long, somewhat sagittate, white, tinged with pale yellow; spike erect, many-flowered. Antioquia, 1870. An improvement on the type, with dark green leaves and pseudo-bulbs. (G. C. 1870, 12.)

H. picta (painted).* *fl.* cinnamon-brown, 3½in. in diameter; sepals narrow-oblong, tips rounded; petals rather smaller, narrowed towards the base; lip shorter than the petals, jointed at the middle; distal portion (epichyle) broadly-hastate, with the broad, blunt, deeply-channelled apex so recurved that the epichyle looks truncate; hypochile somewhat trapeziform, the sides produced backwards into long ascending spurs, that are rather shorter than the column; column yellow, blotched with brown on the back; scape from the base of the pseudo-bulb, stout, ascending, green, six to ten-flowered; sheaths few, short; bracts linear-oblong, green, deciduous; pedicel and ovary ⅔in. long. *l.*, with the slender petiole, 1½in. to 2½in. long, elliptic-lanceolate, acuminate, plaited, green. Pseudo-bulbs tufted, about 3in. long, narrow, ovoid, compressed, grooved. New Granada. (B. M. 6305.)

H. tigrina (tiger-marked). *fl.*, sepals greenish-yellow, barred with brown; petals smaller, rich yellow, barred with crimson; lip white, dotted with brown and barred with light purple. Pseudo-bulbs 2in. long, somewhat ovate, with long dark green obtuse leaves. Columbia, 1852. (I. H. 612.)

H. vittata (striped). A synonym of *Polycycnis vittata*.

HOUND'S TONGUE. *See* **Cynoglossum.**

HOUSELEEK. *See* **Sempervivum tectorum.**

HOUSTONIA (named after Dr. W. Houston, 1695-1733, a writer on American plants). ORD. *Rubiaceæ*. A genus comprising about twenty species of hardy herbaceous perennials, for the most part natives of North-western America. Flowers white, purple, or blue, dimorphous. Leaves opposite, broad or narrow. Houstonias are admirable little plants for growing between large stones on rockwork, where they will flower nearly all the year round. A compost of leaf soil and sand, rather moist, is most suitable. *H. cærulea* forms a pretty pot specimen under cold frame treatment, and may be used with good effect for surfacing the pots in which other hardy bare-stemmed plants are grown. Propagated by careful divisions, in autumn; or by seeds.

FIG. 242. HOUSTONIA CÆRULEA.

H. cærulea (blue).* Bluets. *fl.* usually elegant, light blue, sometimes white; peduncles one-flowered, elongated; corolla salver-shaped, ½in. across. Early summer. *l.* ovate-lanceolate, attenuated at the base; radical ones spathulate, a little hairy. Stem erect, dichotomous. *h.* 3in. to 4in. Virginia, 1785. See Fig. 242. (B. M. 370.)

H. longifolia (long-leaved). *fl.* pale lilac; stamens inclosed. August. *l.* linear-oblong; radical ones tapering at base and ciliated; stipules broad-ovate, entire or bi-tridentate. *h.* 6in. 1828. (B. M. 3099.)

H. serpyllifolia (Thyme-leaved).* *fl.* white; peduncles terminal, one-flowered, elongated. June to August. *l.* spathulate, rather hairy. *h.* 3in. 1826. (B. M. 2822.)

HOUTTEA (named in honour of the late Louis Van Houtte, a celebrated Belgian nurseryman). SYN. *Van Houttea*. ORD. *Gesneraceæ*. A genus comprising three species of stove shrubs, natives of Brazil. Flowers scarlet or spotted; corolla tube cylindrical. Leaves opposite, crenulate, pale or canescent-tomentose underneath. For culture, *see* **Gesnera.**

H. Gardneri (Gardner's).* *fl.* red; peduncles solitary, one-flowered, axillary; three calyx segments acuminate; corolla downy, tubular; perigynous ring five-lobed. July and August. *h.* 2ft. 1841. Plant glabrous. (B. M. 4121, under name of *Gesnera Gardneri.*)

H. pardina (leopard-spotted).* *fl.* orange, red; peduncles axillary, solitary, one-flowered; corolla with curved tube and spotted spreading limb; calyx segments large, spreading; stamens exserted. August to October. *l.* on short petioles, elliptic, thickish, serrate, glabrous above, tomentose beneath. *h.* 1½ft. 1847. Plant downy. (B. M. 4348, under name of *Gesnera pardina.*)

HOUTTUYNIA (named in honour of Houttuyn, the celebrated virtuoso of Amsterdam). Including *Gymnotheca*. SYNS. *Anemia*, *Anemiopsis*, and *Polypara*. ORD. *Piperaceæ*. A genus comprising two or three species of greenhouse perennial herbs, one of which is from California, another is broadly dispersed through the Himalayan region, China, and Japan, and a third is probably from China. Flowers hermaphrodite, spicate, sessile between the bracts; spikes terminal, pedunculate, dense. Leaves alternate, broad or oblong, often cordate at base; stipules large, membranaceous. The species succeed in any light rich soil, and in a moist situation. Increased by divisions, or by seeds.

H. californica (Californian). *fl.*, spadix short, erect, conical, clothed with hermaphrodite flowers without any perianth, but subtended by an involucre of about six oblong, spreading, white bracts, of which the inner three are spotted with red. Summer. *l.* nearly all radical, long-stalked, sub-cordate at base, obtuse, entire. Stem hairy, longer than the leaves. California. (B. M. 5292, under name of *Anemiopsis californica.*)

H. cordata (heart-shaped).* *fl.*, involucre resembling a corolla, of four white, ovate, spreading, elliptical leaflets, inserted immediately below the oblong spadix, which consists of several naked, closely-placed flowers; peduncle terminal, solitary, single-flowered. *l.* cordate-acuminate, alternate, entire, remote, glabrous, nerved, more or less deeply notched at the base. Stem erect, mostly simple, zigzag, glabrous. Japan. (B. M. 2731.)

HOVEA (named after A. P. Hove, a Polish botanist, and collector for Kew). SYN. *Poiretia*. ORD. *Leguminosæ*. A genus comprising eleven species of handsome ornamental greenhouse evergreen shrubs, confined to Australia. Flowers blue or purple, in axillary clusters or very short racemes, or rarely solitary; petals clawed; standard nearly orbicular, emarginate. Leaves alternate, simple, entire or prickly toothed, glabrous above, often tomentose underneath; stipules setaceous, minute or none. Propagation is best effected by seeds, which should be sown in well-drained pots of sandy-peat soil, in spring, and placed in a gentle bottom heat. Cuttings are rather difficult to strike. The seedlings must, when large enough, be potted off in similar soil, and grown on in an intermediate temperature, water being carefully administered, and the points pinched out when the plants are 2in. or 3in. high, to induce a bushy habit. After they become established, plenty of air may be admitted, and a cool greenhouse temperature will suffice. Hoveas are very distinct and desirable plants, on account of their intensely-coloured flowers, which appear in spring. *H. elliptica* is most commonly seen; it has rather a straggling habit, that requires to be corrected by pinching and training when the plants are young. *H. pungens* is smaller-growing, and more compact. The plants are sometimes attacked by Scale, which should be removed by sponging, or by an insecticide.

H. Celsii (Cels's). A synonym of *H. elliptica*.

H. chorizemifolia (Chorizema-leaved). *fl.* purple, rather small, on short pedicels. April. *l.* from ovate to lanceolate, pungent, pointed, sinuate and prickly-toothed, often undulate, coriaceous, reticulate and usually glabrous. *h.* 3ft. 1844. SYN. *Plagiolobium ilicifolium*. (B. R. 1524.)

H. elliptica (elliptic).* *fl.* beautiful deep blue; peduncles axillary, many-flowered. April to June. *l.* lanceolate, and somewhat rhomboid, bluntish, mucronate. Branches rather pilose. *h.* 2ft. to 4ft. 1818. SYN. *H. Celsii*. (B. M. 2005.)

Hovea—*continued.*

H. longifolia (long-leaved). *fl.* very shortly pedicellate, in axillary clusters, which sometimes grow out into interrupted spikes or racemes, or rarely solitary. July. *l.* oblong-lanceolate or linear, obtuse, with or without a small callous point, all under ¾in. long in some varieties, in others all above 2in., thickly coriaceous, with flat recurved or revolute margins. *h.* 8ft. to 10ft. 1805. The following forms, usually considered as distinct species, are, according to Bentham, merely varieties of above: *lanceolata* (*H. lanceolata*, B. M. 1624; *H. purpurea*, L. B. C. 1457); *normalis* (*H. longifolia*, B. R. 614; *H. racemulosa*, B. R. 1843, 4); and *pannosa* (*H. pannosa*, B. M. 3053; *H. purpurea*, B. R. 1423).

H. pungens (stinging).* *fl.* blue, one to three together on short pedicels. *l.* linear or lanceolate, ½in. to 1in. long, very spreading, rigidly coriaceous, with pungent points; margins much revolute. *h.* 1ft. to 2ft. 1837. (P. M. B. vi. 101, x. 51.)

HOVENIA (named after David Hoven, a senator of Amsterdam). ORD. *Rhamneæ.* A monotypic genus, the species being an ornamental greenhouse or half-hardy evergreen shrub, which thrives well in a sandy-loam soil. Ripened cuttings will root in sand, under a hand glass. The Hovenia proves hardy in the more southern parts of this country, if slightly protected in winter.

H. dulcis (sweet). *fl.* white, small, in axillary and terminal dichotomous panicles; peduncles sub-cylindrical, reflexed, smooth, 1in. long, thickening after flowering, containing a sweet red pulp. Summer. *l.* alternate, broad, cordate, serrated. *h.* 8ft. China, Japan, and the Himalayas, 1812. The plant from the Himalayas is frequently called *H. inæqualis.* (B. M. 2360.)

HOWARDIA. A synonym of **Pogonopus** (which *see*).

HOWEA (from Lord Howe's Island, where only the genus is found). Sometimes spelt *Howiea.* SYN. *Grisebachia.* ORD. *Palmeæ.* A genus comprising two species of stove palms. For culture, *see* **Kentia.**

H. Belmoreana (Belmore's).* Curly Palm. *fl.*, inflorescence of long and thick, simple, nodding or pendulous spikes; rachis with a triple spire of deeply-excavated notches, closely crowded, with raised margins. *fr.* oblong or ellipsoid, 1in. to 1½in. long; the pericarp hard in the dried state. *l.* 6ft. to 8ft. long, with numerous acuminate segments. Stems attaining 35ft. in height. SYNS. *Grisebachia Belmoreana, Kentia Belmoreana.*

H. Forsteriana (Forster's).* Flat or Thatch Leaf Palm. This closely resembles above in the male flowers and fruits; but the leaf segments are said to be always hanging, whilst in *H. Belmoreana* they are converged upwards. SYN. *Kentia Forsteriana.*

HOYA (named after Thomas Hoy, once gardener to the Duke of Northumberland, at Sion House). Honey Plant; Wax Flower. Including *Centrostemma, Cyrtoceras, Otostemma,* and *Pterostelma.* SYNS. *Schollia, Sperlingia.* ORD. *Asclepiadeæ.* A genus comprising about fifty species of very ornamental stove scandent or decumbent shrubs, natives of Western Asia, tropical and sub-tropical Australia, but found in the greatest abundance in the Malayan Archipelago. Flowers medium or large, rarely small; corolla rotate. Leaves opposite, fleshy or coriaceous. Hoyas are very interesting and beautiful plants, producing handsome wax-like flowers. Most of them succeed better in an intermediate temperature than where it is very hot. They are not so well adapted for training on rafters, or any dry surface, as on a wall, or in a position where more moisture is present, such as that of a warm greenhouse or stove. *H. carnosa* is a fine species, and the one most frequently grown. It sometimes becomes attached to a wall, like Ivy, and grows freely when planted out at the base. *H. bella* and *H. Paxtoni* are slender-growing plants, requiring a little more heat. They are well adapted for culture in hanging baskets, or over pieces of dead tree fern, placed in the middle of pans. Propagation is generally effected by cuttings, or by layers. *H. bella*, however, succeeds best when grafted on a stronger-growing sort than it does on its own roots. Cuttings should be taken in spring, or later in the year, from shoots of the preceding summer's growth, inserted in soil composed of peat and sand, and plunged in bottom heat, inside a frame or under a bell glass. A slight shade and careful watering will be necessary. When rooted, shift into larger pots, using soil of a similar description, and stop the points of the shoots when growth is resumed. For propagation by layering, good-sized pieces should have a few of their leaves removed,

Hoya—*continued.*

and be layered in pots of soil until rooted. The plants may afterwards be grown on and repotted, according to their strength, in various-sized pots, or any of the strong-growing species may be planted out in rather rough peaty soil, care being taken to render the drainage efficient. Hoyas do not require much shade, nor an atmosphere too closely confined. They should be allowed to rest in winter, by keeping rather drier and in a lower temperature. The flower stalks should not be cut off, as the flowers of the next year are produced on them, as well as on the young wood, when it is growing well. Sometimes, when plants attach themselves to a moist wall, they do well even if the roots in the soil die away. The species described below are climbers, except where otherwise stated.

H. australis (Southern).* *fl.* white, tinged with pink, with a Honeysuckle-like scent; disposed in deflexed umbels. October. *l.* obovate or sub-orbicular, coriaceous, deep green. Queensland and New South Wales, 1863. (B. M. 5820.)

H. bella (beautiful).* *fl.* waxy-white, with a rosy-crimson centre; umbels many-flowered. *l.* small, opposite, dark green on the upper side. *h.* 1½ft. India, 1847. (B. M. 4402.) *H. Paxtoni* closely resembles this in habit and appearance, but has less fleshy, more acuminate, and lighter green leaves, and pure white flowers with pink centres. Both species are of a dwarf, shrubby slender habit, forming a drooping mass.

H. campanulata. *See* **Physostelma Wallichii.**

FIG. 243. FLOWERING STEM OF HOYA CARNOSA.

H. carnosa (fleshy).* Wax Flower. *fl.* pinkish-white; corolla fleshy, bearded inside; umbels pendulous, on short peduncles; pedicels pubescent. Summer. *l.* fleshy, oval-oblong, acuminated. Queensland, 1802. See Fig. 243. (B. M. 788, under name of *Asclepias carnosa*). There is a form of this species with variegated leaves. See Fig. 244.

H. cinnamomifolia (Cinnamon-leaved).* *fl.* large; corolla pale yellow-green; rotate segments broadly-ovate, acute; leaflets of the staminal crown deep purple blood-colour, ovate, acute, thick, fleshy. July. *l.* opposite, on short, very thick petioles, large, ovate, slightly peltate, acuminate, thick; three central nerves very conspicuous. Stem long, branched, twining. *h.* 10ft. Java, 1847. (B. M. 4347.)

H. coriacea (leathery). *fl.* brownish-yellow, produced in large umbels. Summer. *l.* ovate acute, coriaceous, dark green. Manilla, 1838. (B. M. 4518.)

H. coronaria (crowned). *fl.* yellow. November. *l.* oval, acute, with recurved edges, coriaceous, villous beneath. Java, 1846. (B. M. 4969.)

Hoya—*continued.*

H. Cumingiana (Cuming's).* *fl.* greenish-yellow or white, with a coronet of rich purplish-brown; umbels axillary, short. Spring and summer. *l.* closely packed, flat, sessile, cordate, slightly downy beneath. Malay Archipelago. (B. M. 5148.)

H. globulosa (globular).* *fl.* pale straw or cream-colour, disposed in globose umbels; corona pink at base. April. *l.* oblong, coriaceous, rounded at the base, acuminate at the apex, more or less hairy. India, 1880. (G. C. n. s., xvii. 741.)

H. imperialis (imperial).* *fl.* reddish-brown, very large, about 3in. across, waxy; umbels 8in. to 9in. in diameter, and eight to ten-flowered. June. *l.* 6in. to 9in. long, slightly tomentose, light green. Borneo, 1847. A very noble plant. (B. M. 4397.)

H. lacunosa (furrowed). *fl.*, corolla greenish-yellow, rotate; inner surface covered with velvety hairs; peduncles interpetiolar, solitary, usually shorter than the leaves, bearing a flattened umbel of numerous flowers. March to June. *l.* opposite, elliptic-lanceolate, acuminated, marked above with a depressed midrib and a few horizontal depressed veins; petioles thick, short. Branches terete, throwing out roots from various points. Indian Archipelago, 1854. (B. M. 4826.)

H. l. pallidiflora (pale-flowered). *fl.* almost colourless. *l.* broader than in the type; nervation obsolete. Java. (B. M. 5272.)

FIG. 244. HOYA CARNOSA VARIEGATA.

H. linearis (linear).* *fl.* white, in a sessile, terminal, lax umbel. Autumn. *l.* shortly stalked, cylindrical, sub-acute, deeply grooved beneath, dark green. Himalaya. A charming plant, with slender pendulous branches, suitable for cultivation in hanging baskets.

H. multiflora. This is the correct name of the plant described in this work under the name of **Cyrtoceras multiflorum** (which *see*).

H. ovalifolia (oval-leaved). *fl.* bright yellow, with a red corona; produced in large umbels. Summer. *l.* fleshy, narrowly oval, about 6in. long, rolled back at the edges, dark green. India, 1840. (L. & P. F. G. 25.)

H. pallida (pale).* *fl.* pale yellow or straw-colour, with a pink corona; very fragrant, disposed in moderate-sized umbels. Summer. *l.* fleshy, ovate, dark green. India, 1815. (B. R. 951.)

H. Paxtoni. *See* **H. bella.**

H. Pottsii (Potts's).* *fl.* pale yellow, slightly downy, fragrant; corona rather purple in the centre; umbels globose. *l.* cordate, acuminated, with a rusty stain partly spread over them, pale whitish beneath. India, 1824. (B. M. 3425.)

H. purpureo-fusca (purplish-brown-flowered). *fl.* purplish-brown, produced in large umbels. September. *l.* ovate, slightly acuminate, fleshy, dark green. Java, 1849. (B. M. 4520.)

H. Shepherdi (Shepherd's).* *fl.* small; corolla delicate white and rose-colour; umbels about 2in. in diameter. June. *l.* 2in. to 6in. long, four lines wide, shortly acuminated at the apex, dark and channelled on the upper side, paler and semi-terete beneath; they are, as it were, geniculated at the apex of the short terete petiole, or bent down suddenly at an angle, and thus become pendent. *h.* 3ft. Sikkim-Himalaya and Khasia, 1860. A very remarkable plant. (B. M. 5269.)

H. trinervis (three-nerved). *fl.* pale greenish-yellow, slightly scented; corona whitish, with a yellowish tinge in the centre; umbels globose. Summer. *l.* variable in size, oblong, sharply acuminated, light yellowish-green above. China. 1824.

HUCKLEBERRY. *See* **Gaylussacia.**

HUDSONIA (named after William Hudson, 1730-1793, a London apothecary, and author of "Flora Anglica"). ORD. *Cistineæ.* A genus comprising three species of half-hardy evergreen shrubs, from North America. Flowers yellow, small, numerous, showy, crowded along the upper part of the branches. Leaves awl-shaped, scale-like, persistent, downy. The species thrive best in pots of well-drained peaty or sandy soil, but are rather difficult to cultivate. Propagated by layers; or by ripened cuttings, inserted in sand, under a hand glass.

H. ericoides (Heath-like).* *fl.* yellow; peduncles solitary, rising laterally from the leafy bud. May to July. *l.* filiform, awl-shaped, rather imbricated. Stems suffruticose. *h.* 1ft. Maine to Virginia, 1805. (L. B. C. 192; S. C. 36.)

H. tomentosa (tomentose). *fl.* yellow, sessile or short-peduncled. May and June. *l.* oval or narrowly-oblong, short, close-pressed and imbricated. *h.* 1ft. North America, 1826. Plant hoary with down. (S. C. 57.)

HUEGELIA. Now included under **Gilia** (which *see*).

HUERNIA (named after Justus Huernius, one of the earliest collectors of Cape plants). ORD. *Asclepiadeæ.* A genus comprising about eleven species of interesting greenhouse succulent plants, with the habit of *Stapelia*, from the Cape of Good Hope. Flowers large; corolla bell-shaped, five-fid, fleshy; corona double, outer one lobed, interior with five scales. For culture, *see* **Stapelia.**

H. barbata (bearded). *fl.* cream-coloured, variegated with elevated purple spots; disposed in fascicles at the base of the branches; peduncles two or three-flowered. August. Branches four or five-angled, with spreading, acute teeth. *h.* 6in. 1795. (B. M. 2401, under name of *Stapelia barbata.*)

H. brevirostris (short-beaked).* *fl.* yellowish, minutely spotted; tube pinkish-white, blood-red at bottom; peduncles four to six-flowered. Branches erect or ascending, four, or rarely five-angled. *h.* 6in. 1877. (B. M. 6379.)

H. campanulata (bell-shaped). *fl.* yellow; corolla campanulate, closed at bottom by clavate horizontal hairs; ligules spreading, truncate, dark. July to October. *h.* 6in. 1795. (B. M. 1227, under name of *Stapelia campanulata.*)

H. lentiginosa (freckled). *fl.* sulphur-colour, dotted with red; peduncles three-flowered. July. Branches pentagonal, spreading, furnished with hooked teeth or tubercles. *h.* 6in. 1795. (B. M. 506, under name of *Stapelia lentiginosa.*)

H. oculata (eyed).* *fl.*, corolla tube almost hemispherical, white inside; limb deep violet-purple; column short. Summer. Branches soft, pale green, five-angled, quite glabrous. *h.* 3in. to 4in. Dammara Land, 1880. (B. M. 6658.)

H. reticulata (netted). *fl.*, corolla with a purplish bottom; limb yellow, dotted with purple; twin or tern. August. Branches pentagonal, denticulated, sap-green, with purple spots. *h.* 6in. 1793. (B. M. 1662, under name of *Stapelia reticulata.*)

HUMATA. Included under **Davallia** (which *see*).

HUMBLE BEE (*Bombus terrestris, B. lucorum, &c.*). Humble Bees (see Fig. 245) have been known to damage Beans and cultivated flowers that have the nectar at the bottom of a long tube, by boring a hole in the calyx to obtain the nectar more easily. The flowers are not fertilised when robbed in this way, and the seeds become

FIG. 245. HUMBLE BEE.

abortive. Yet though this at times occurs, the damage done by it is so slight that the Bees ought to be regarded as useful allies, because of the services rendered by them in conveying pollen from flower to flower. There is reason to believe that certain plants, *e.g.*, Red Clover, are dependent on Humble Bees for their fertilisation. Should the

Humble Bee—*continued.*

Bees become really injurious, their numbers are most easily lessened by the destruction of their nests, which will be found under moss or stones, or in holes in the ground.

HUMBLE PLANT. *See* **Mimosa pudica.**

FIG. 246. HUMEA ELEGANS.

HUMEA (named after Lady Hume, once of Wormeleybury, Herts). SYNS. *Agathomeris*, *Calomeria*. ORD. *Compositæ*. A genus comprising four species of herbs or shrubs, limited to Australia. Flower-heads small and numerous, in a loose terminal panicle, or in compact corymbs. Leaves alternate, quite entire. The best-known and most frequently cultivated species is *H. elegans*, a very ornamental plant, when well grown, for greenhouse decoration or sub-tropical gardening. It is a biennial. The seed should be sown in July, in light, finely-sifted soil, and placed in any cool frame. When the plants appear, they should be potted, taking care not to injure the roots. Grow on in a frame or cool house, where plenty of light and air are available, and keep the roots nearly dry throughout the winter. In spring, gradually encourage growth, and pot on, placing into about 9in. pots as a final shift. The plants seldom succeed, unless very carefully treated in potting and watering. They do not like syringing, unless when growing strongly in warm weather. Being tender, they must not be planted outside before June, and must then be staked and protected from rough winds. A rich soil, composed of loam and decayed manure, with a little charcoal added, should be used, when potting, after the young plants are once established.

H. elegans (elegant).* *fl. heads* brownish red, pink, or crimson, minute, disposed in a large, loosely-branched, terminal, drooping panicle. July to October. *l.* large, oblong or lanceolate, clasping or decurrent at the base. *h.* 5ft. to 6ft. See Fig. 246.

HUMIFUSE. Spread over the surface of the ground.

HUMILIS. Low; when the stature of a plant is not particularly small, but much less than that of a kindred species.

HUMIRIACEÆ. A small natural order of balsam-bearing trees or shrubs, natives of tropical America. Flowers white, disposed in corymbose cymes, axillary, terminal or lateral. Leaves alternate, simple, entire or crenulate, coriaceous, exstipulate. There are three genera, and about twenty species. The genera are: *Humiria*, *Sacoglottis*, and *Vantanea*.

HUMULUS (from *humus*, the ground; plant prostrate if not supported). Hop. ORD. *Urticaceæ*. A genus containing a couple of species of ornamental hardy perennial twiners, of easy culture in ordinary garden soil, but thriving best in a deep loam. *H. Lupulus* is a vigorous and quick-growing plant; the second species is a native of China, Japan, &c. Propagated by seeds, or by divisions, in spring.

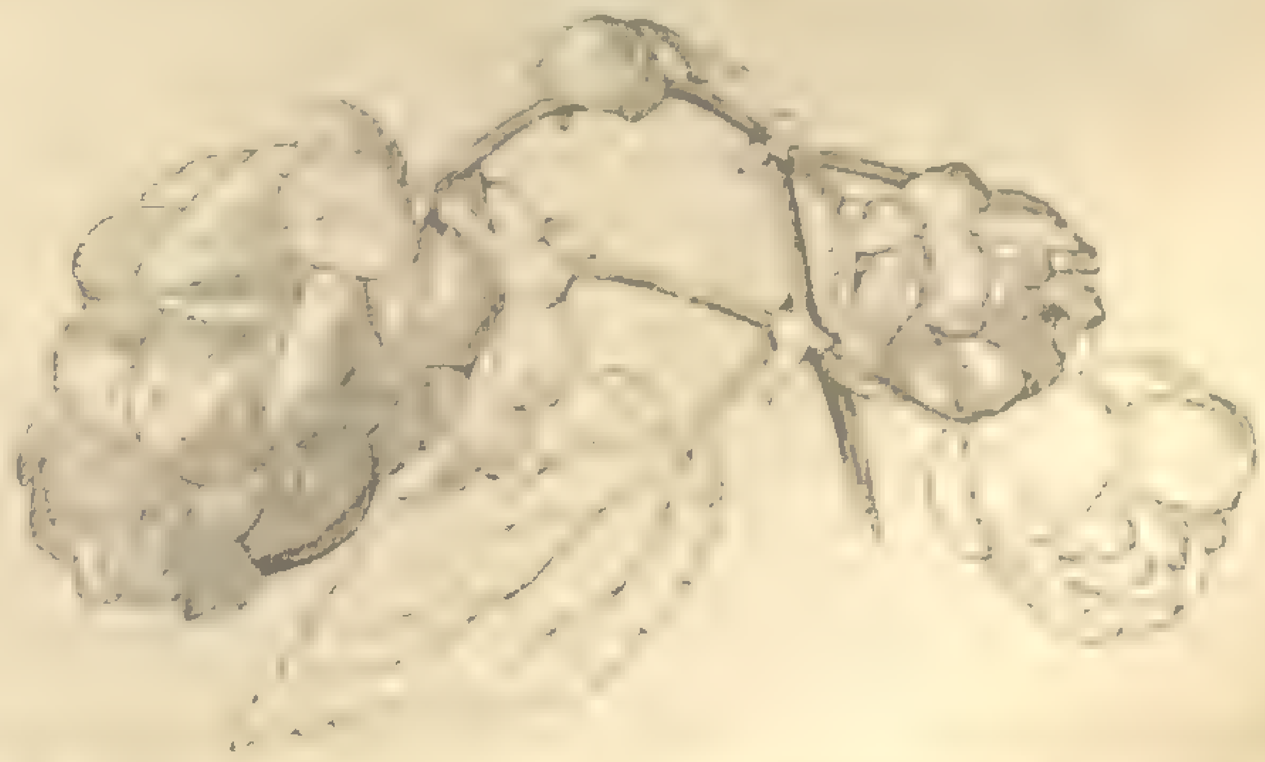


FIG. 247. PORTION OF FEMALE INFLORESCENCE OF HUMULUS LUPULUS.

H. Lupulus.* Common Hop. *fl.* greenish-yellow; males in loose axillary panicles; females in shortly-stalked, axillary, roundish spikes or heads. Summer. *l.* opposite, stalked, cordate, serrate, veined, rough. Stem branched, angular, rough. Temperate Europe (Britain), Asia, North America. There are several varieties, the best of which are the White Bines, the Goldings, and the Grapes. Hops are extensively grown both here and on the Continent, and in England alone some 50,000 acres of land are devoted to their culture. The heads of fruit are used in brewing, and the young blanched foliage is a good potherb. See Fig. 247. (Sy. En. B. 1284.)

HUMUS. The name given to the black substance that results from the decay of plants in the soil. Earth containing much Humus is often called Vegetable Mould or Black Earth, on account of its colour. This substance contains all the mineral compounds that existed in the living plants, but it chiefly consists of compounds of carbon, along with oxygen and hydrogen. Nitrogen, also, is present, chiefly in compounds of ammonia. Decaying organic matter becomes broken up into several acids (humic, ulmic, crenic, &c.), which have a great power of absorbing ammonia from the air, or from its less stable compounds in the soil, and of forming with it substances of greater permanence and more suited to yield the nourishment that plants require. Hence Humus, which is largely made up of these acids, acts an important part in storing up ammonia till required by plants; and there seems reason to believe that it may even cause the production of ammonia by decomposing water (H_2O), and setting free the hydrogen in it, in a state in which it readily combines with the nitrogen of the air to form ammonia (H_3N), which then combines with the organic acids in the soil. Humus absorbs water readily, yielding it up as the plants require moisture. It has also been suggested that it may be of value because of the carbonic acid (CO_2) formed in and emitted by it; but it is very doubtful whether the roots absorb that gas. It is certain, however, that the mineral compounds required by plants, and present in their decaying remains, are in a state better suited to be absorbed anew by growing plants than are the same compounds when derived only from the decomposition of rocks or inorganic soils. These properties explain why it is that Humus is beneficial to plant life, though, when present in excess, *e.g.*, in certain kinds of peat, it renders the soil swampy, acid, and unsuitable for the growth of plants, except of a few kinds, chiefly rushes, sedges, and some grasses, none of which are of any value in cultivation. The organic matter (so called because it is derived from the decay of organised beings, *i.e.*, of plants and animals) varies largely in amount in different soils. It is composed chiefly of Humus. In very poor soils, it may hardly be present at all. Good agricultural soils contain from 3 to 8 or 10 per cent. of it by weight. Old gardens, and other soils that have been long under careful cultivation (shown by their dark colour), may contain as much as 25 per cent.; and peaty soils may be almost entirely composed of it.

In the case of ordinary agricultural soils, if the produce is constantly removed, and none is returned to the soil, the Humus becomes exhausted, or so much diminished as no longer to supply the needs of the plants. Therefore, it is necessary to replace the missing substances as far as can be done; and this is most fully effected by the use of farmyard manure, in which is contained decaying organic matter fitted to restore the Humus that the crops have removed. Other manures are frequently employed to hasten the decay of plant remains in soil, and to increase the amount of Humus thereby; while others are added to supply only certain substances in which the soil is deficient, or to afford more stimulating food to plants than they could obtain from the soil for themselves.

HUNGARIAN LOTUS. *See* **Nymphæa thermalis.**

HUNNEMANNIA (named after J. Hunnemann, a zealous botanist, who died in 1837). ORD. *Papaveraceæ.* A monotypic genus, the species being a very showy, half-hardy, erect-growing perennial, with solitary, terminal flowers, and decompound, glaucous leaves. It requires a rich soil. Seeds should be sown in spring or autumn, in the open border, and protected during winter.

H. fumariæfolia (Fumaria-leaved). *fl.* yellow, like those of *Eschscholtzia californica.* July to October. *l.* decompound and triternate, glaucous; leaflets linear, blunt. *h.* 2ft. to 3ft. Mexico, 1827. (B. M. 3061.)

HUNTLEYA. Now included, by Bentham and Hooker, under **Zygopetalum** (which *see*).

HURA (its American name). Sand-box Tree. ORD. *Euphorbiaceæ.* A genus containing two or three species, natives of tropical America; one, *H. crepitans*, is a curious stove evergreen tree, commonly cultivated in most tropical countries. Huras thrive in a light loamy soil. Propagated by cuttings, inserted in sand, in heat, and covered with a bell glass.

H. crepitans (crackling). *fl.* reddish, inconspicuous, sterile and fertile on different plants. *fr.* rounded, hard-shelled, about the size of an orange; when ripe, and exposed to the action of a dry atmosphere, it bursts with a loud crack, whence the specific name. *l.* glossy, Poplar-like. *h.* 30ft. to 40ft. 1733. This tree abounds in a venomous milky juice.

HUTCHINSIA (named after Miss Hutchins, of Bantry, an accomplished cryptogamic botanist). ORD. *Cruciferæ.* A genus limited, by some authorities, to one species; by others, extended to a few allied ones from Southern Europe and Russian Asia, or also to two or three perennials from the high mountain ranges of Central and Southern Europe. The genus is nearly allied to *Iberis* and *Iberidella.* The species described below is a pretty little subject for the rock garden, or for margins or borders, in sandy soil. Propagated by divisions, or by seeds.

H. petræa (rock).* *fl.* very minute. Spring. *l.*, radical ones pinnate; stem ones with fewer and narrower segments. *h.* 3in. Central and Southern Europe (Britain). A glabrous, delicate, erect annual. (Sy. En. B. 151.)

HYACINTH. *See* **Hyacinthus.**

HYACINTHELLA. Included under **Hyacinthus** (which *see*).

HYACINTH, GRAPE. *See* **Muscari.**

HYACINTHUS (the ancient Greek name, used by Homer, for the Iris). Hyacinth. Including *Bellevallia, Hyacinthella*, and *Peribœa.* ORD. *Liliaceæ.* A genus containing about thirty species of tunicated bulbous plants, of which three are from tropical and Southern Africa, and all the rest natives of the Mediterranean region and the Orient. Flowers in simple, lax or dense racemes; perianth funnel or bell-shaped, with six sub-equal, spreading, erect or recurved lobes; scape leafless. Leaves all radical, linear or strap-shaped. The very numerous varieties that have originated from *H. orientalis* and *H. o. provincialis*, are esteemed some of the most popular and beautiful of spring-flowering plants for indoor and outdoor decoration. By forcing, and careful management in keeping a succession, Hyacinths may be had in flower nearly all the winter, and up till the end of May. Nearly all the supplies of new bulbs for this and several other countries are obtained from Holland. The soil there is sandy, and specially adapted, with the climate, to the cultivation of any quantity of bulbs. Propagation is effected by seeds for obtaining new varieties, and by offsets for perpetuating named or distinct kinds. Seeds are seldom sown in this country, as most of the new varieties are raised on the Continent. If required, they may be sown in light sandy soil, about September, covered with ½in. of similar soil, and protected throughout the winter. It usually takes from four to six years before they reach the flowering stage. Offsets should be removed soon after the old bulbs are taken up, and be planted out, about 2in. deep, in light soil. They generally flower the third year. For increasing a number of offsets of scarce varieties, the Dutch growers make one or two cross cuts half-way through healthy old bulbs, after taking them up. The following year, only a little growth is made above ground, but a quantity of young bulbs are formed beneath, which are afterwards separated, and planted in nursery beds. As the advantages possessed by the Dutch, in raising varieties and growing bulbs, are far superior to anything attainable in this country, nearly the whole of the trade is left to them, and the produce annually exported in immense

Hyacinthus—*continued.*

quantities. Hyacinths should be grown in pots for forcing and for exhibition; the single varieties succeed well in glasses of water, and are ornamental thus treated for room decoration. For a spring display in the open ground, Hyacinths are unexcelled, especially when arranged in flower beds, or anywhere in a mass.

The Roman Hyacinth. The early Roman Hyacinth is an extremely useful variety, with pure white flowers that may be had by November, as the bulbs arrive much earlier than those of the large-flowering sorts. Place three or four in a 5in. pot, just covering them with soil; afterwards water, and cover the whole up outside with about 6in. of ashes. When the pots become filled with roots, they should be taken into heat, and growth in the tops encouraged by frequent syringings. Some growers of this variety on a large scale, force the bulbs in boxes, and pot up just before coming into flower. This root disturbance does not injure the flowers much, when they are nearly fully developed; and the bulbs, so severely forced, are not of much further use. It is well to keep a portion of the stock for potting, along with the large-flowering sorts, as the early Roman is always much appreciated, and is far more useful for cutting, and for any decoration in winter.

Culture in Pots. Hyacinth bulbs should be secured as soon as possible after they arrive in autumn. The large-flowered varieties, which usually come over in September, should be potted singly in 5in. or 6in. pots, according to the size of bulb, and be covered with ashes in the same way as described above for the early Roman. The chief use of ashes is to keep the bulbs from rising when their new roots come in contact with the soil. A good potting compost is fibry loam and manure in about equal parts, with some river sand intermixed. The pots should be filled lightly, and the bulb pressed into the soil, so that its base is firmly fixed. This plan is much better than partially filling the pot and afterwards covering the bulb. Before subjecting any plants to heat, they should be well rooted, and the crowns just beginning to expand. The large-flowered varieties may be had in flower by the end of December, if they are potted early and carefully forced. Where a succession is the principal aim, rather than a large quantity at one time, it is best to divide the number of bulbs, and pot at intervals of about six weeks from August till the end of November. In winter, forcing should be conducted in a structure where all possible light is admitted; but, later in spring, any warm house will do, if not kept too much shaded. In March and April, the principal stock should be retarded, by placing them in a house or pit with a north aspect. Plenty of water should always be applied, and manure water is beneficial after the flower-spikes appear.

Culture in Glasses. Single varieties of Hyacinths are better adapted for culture in glasses than double ones. Special glasses are made, so that the bulb need not become submerged in the water. Soft rain-water should be used for filling them, a little charcoal placed in it, and some of the best bulbs selected. They should be inserted in moss, so that the base is just in contact with the water, and be then kept in a cool, dark place, until roots are emitted. A little additional water occasionally, and a light position, will be all they afterwards require until flowering.

Outside Culture. Hyacinths grown in the open ground need not be so large or choice as those cultivated under glass. They succeed best in light soil and in a sunny position. If the latter has been occupied by other plants throughout the summer, some manure should be added, and the soil well dug, before planting in October. For securing a display in flower beds in spring, the bulbs should be inserted about 9in. apart and 3in. deep, care being taken to place them all at an equal depth. They should be protected, if the weather is severe, especially

Hyacinthus—*continued.*

after the flower-shoots appear. If a covering of new cocoa-nut fibre is placed all over the bed before any of the flowers expand, it tends to heighten the effect they produce, and preserves them from being splashed by heavy storms. The bulbs, if left alone to ripen, or if lifted and dried slowly, may be used another year; but they generally deteriorate, and are not so good as others fresh imported. Any that are forced in pots are of little use afterwards, except for planting in mixed or shrubbery borders outside. Neat stakes are requisite for many varieties, to prevent the flowers being broken off by their own weight. The quality of Hyacinth bulbs for any purpose is a matter of material importance. Mere size is no criterion of quality, soundness and density being the chief points. If the bulbs are hard and heavy, in proportion to their size, the production of good flowers may be confidently expected.

H. amethystinus (amethystine-blue).* Spanish Hyacinth. *fl.* bright blue, drooping, unilateral or nearly so; spikes loose, four to twelve-flowered; bracts length of the pedicels. Spring. *l.* narrow, linear, as long as, or longer than, the flower-scape. *h.* 4in. to 12in. South Europe, 1759. (B. M. 2425.)

H. candicans (white). A synonym of *Galtonia candicans.*

H. corymbosus (corymbose).* *fl.*, perianth lilac-rose, ½in. long; segments erecto-patent; racemes clustered, four to nine-flowered;

FIG 248. HYACINTHUS ORIENTALIS.

Hyacinthus—*continued.*

pedicels erecto-patent; scape 2in. to 3in. long. Autumn. *l.* five or six, fleshy-herbaceous, semi-terete, 2in. to 4in. long, one line broad, pale green. Cape of Good Hope, 1793. (A. B. R. 345.) SYN. *Massonia corymbosa* (B. M. 991).

H. orientalis (Eastern).* Common Hyacinth. *fl.* fragrant, varying very much, clustered. Spring. *l.* lanceolate, grooved, dark green. *h.* 8in. to 12in. Syria, &c., 1596. See Fig. 248. (B. M. 937.) From this and its sub-species, *H. o. provincialis*, the various-coloured, full-spiked, single and double varieties of the garden Hyacinth have been produced.

H. o. albulus (small white).* This is the Roman Hyacinth of the bulb merchants, and is the most useful for very early forcing. It is of slender habit, with erect leaves, small racemes of white flowers with oblong segments, and the tube scarcely ventricose. Southern France.

H. o. provincialis (Provence) is a sub-species with more slender, green-channelled leaves, and slightly smaller, fewer-flowered racemes. South France, Switzerland, Italy.

H. romanus (Roman). *fl.* scentless; perianth white or pale blue; segments lanceolate, sub-acute; raceme twenty to thirty-flowered, 2in. to 3in. long and 1in. to 2in. broad when fully expanded; scape 6in. to 12in. long. May. *l.* four or five, erecto-patent, green, glabrous, fleshy-herbaceous, 1ft. to 1½ft. long, ½in. broad. Greece, Rome, &c. (B. M. 939, under name of *Scilla romana.*) The Roman Hyacinth of bulb-growers is **H. orientalis albulus** (which *see*).

H. spicatus (spicate). *fl.* six to twelve, densely sub-spicate; perianth bluish, obscure; segments erecto-patent, lanceolate; scape 1in. to 3in. long. February. *l.* six to eight, linear, fleshy-herbaceous, 3in. to 6in. long, 4in. broad, narrow at base. Greece, Crete, &c., 1826. (B. R. 1869.)

VARIETIES. These are extremely numerous, and are represented in pure white and in many shades of colour. The single-flowered varieties are most ornamental, and are cultivated much more largely than the double forms. Some of the latter are, however, very attractive, and produce large spikes, closely packed with small rosette-

FIG. 249. DOUBLE-FLOWERED VARIETY OF GARDEN HYACINTH.

like flowers (see Fig. 249), which are useful for wiring singly for buttonholes. The following list includes a selection of the best varieties in general cultivation. Variously-coloured varieties are sold in mixtures, unnamed, at a cheaper rate than named ones, and are very useful for growing in flower borders.

Hyacinthus—*continued.*

Single Black. CHRISTY MINSTREL, black, close spike, one of the best; GENERAL HAVELOCK, purple and black, handsome spike, fine exhibition variety; MASTERPIECE, black, fine spike, extra good; OTHELLO, purplish-black; PRINCE ALBERT, shining black, large compact spike; VON HUMBOLDT, purplish-black, long spike, good for exhibition.

Single Blue. ARGUS, bright blue with clear white centre, beautiful long spike, distinct; BLONDIN, bluish-purple externally, paler inside, fine large spike; CHARLES DICKENS, light blue, shaded lilac, one of the best in cultivation; DUKE OF CONNAUGHT, beautiful dark blue, handsome spike; GENERAL LAURISTON, dark blue, with light eye, large spike; GRAND LILAS, porcelain-blue, one of the best; KING OF THE BLUES, rich dark blue, large bells and magnificent spike, one of the best grown; LEONIDAS, clear blue, large and distinct; LORD DERBY, porcelain-blue, large spike; LORD MELVILLE, clear dark blue, white eye, distinct and good; LORD PALMERSTON, greyish-blue, white eye, fine bells and spike; LOTHAIR, bright blue, shaded mauve; MIMOSA, dark purple, fine and distinct; PRINCESS MARY OF CAMBRIDGE, pale porcelain, extra; SIR JOHN LAWRENCE, dark blue with white eye, bold and effective spike.

Single Lilac and Mauve. ADELINA PATTI, reddish-lilac, close spike, distinct; DE CANDOLLE, lilac and mauve, handsome spike, fine show variety; HAYDN, lilac-mauve, distinct and excellent; HONNEUR D'OVERVEEN, deep mauve, close spike, good; SAUNDERSON, violet-purple, one of the best for exhibition; SIR E. LANDSEER, dark reddish-lilac, close spike, extra fine.

Single Red and Pink. CAVAIGNAC, beautiful pink, deep rosy stripes, fine bells and spike, extra; DUCHESS OF RICHMOND, rich pink, fine spike; FLORENCE NIGHTINGALE, blush-rose, large bells, closely arranged; GARIBALDI, bright crimson, good spike, early; HOWARD, brick-red, close spike, distinct and good; LADY PALMERSTON, bright rose-pink, large close truss; LE PROPHÈTE, pale rose, marked with crimson, handsome spike; L'INCOMPARABLE, bright red, good; LINNÆUS, bright orange-crimson, close spike, extra fine; MACAULAY, rose with carmine stripes, good show variety; MADAME HODGSON, pale pink, well-formed spike, fine for glasses; NORMA, waxy-pink, very large bells, early and extra fine; PRIMA DONNA, rosy-red with light centre, handsome exhibition variety; PRINCE ALBERT VICTOR, rich bright crimson, large bells, and finely-arranged spike; PRINCESS CHARLOTTE, deep rose, white centre, large bells; ROBERT STEIGER, bright red, one of the best bedding or decorative sorts; VICTORIA ALEXANDRINA, deep red, extra fine and distinct; VON SCHILLER, salmon-pink with crimson stripes, fine show or decorative variety.

Single White. ALBA MAXIMA, pure white, very early, one of the best; ALBA SUPERBISSIMA, pure white, large and compact spike, good for bedding; BARONESS VAN TUYLL, pure white, long handsome spike, early; GRANDEUR À MERVEILLE, pale blush, large bells, close handsome spike; GRAND VAINQUEUR, pure white, very early; GRAND VEDETTE, white, large bells and very long spike; LA GRANDESSE, pure white, long and handsome spike, one of the best for exhibition; LA NEIGE, white, one of the earliest; L'INNOCENCE, pure white, large bells and magnificent spike; LORD SHAFTESBURY, pure white, extra large spike; MADAME VAN DER HOOP, purest white, extra large, good spike; MONT BLANC, pure white, long spike, fine show variety; QUEEN OF THE NETHERLANDS, white, handsome spike, extra; SNOWBALL, pure white, extra large bells, immense spike.

Single Yellow. BIRD OF PARADISE, clear yellow, long spike, excellent variety; GRAND DUC DE LUXEMBOURG, clear primrose-yellow, good spike; IDA, beautiful primrose-yellow, large bells, compact spike, extra fine; LA CITRONIÈRE, pale yellow, good; L'OR D'AUSTRALIE, clear yellow, extra fine; PRIMROSE PERFECTION, primrose-yellow, splendid spike, fine for exhibition.

Double Blue. BLOCKSBERG, porcelain, large bells, and good spike; GARRICK, light blue, shaded, good; LAURENS KOSTER, dark blue, close handsome spike, one of the best double varieties; LOUIS PHILIPPE, bright blue, striped, extra fine; MAGNIFICENCE, light blue, large bells, and fine spike; REMBRANDT, rich dark blue, large bells, distinct, and good.

Double Red. GROOTVORST, fine delicate blush, early; KOH-I-NOOR, pale red, semi-double, long spike; LORD WELLINGTON, pale rose, large bells and handsome spike, good show variety; MILTON, deep red, large compact spike, extra; SUSANNA MARIA, bright rose, large handsome spike; WATERLOO, or BOUQUET TENDRE, deep red, good spike, very early.

Double White. ANNA MARIA, blush, with purple centre, good spike; COMTESSE DE ST. BRIEST, creamy-white, large; JENNY LIND, white with purple centre, distinct; LA TOUR D'AUVERGNE, pure white, long spike, one of the best; PRINCE OF WATERLOO, pure white, large handsome spike, extra fine; SCEPTRE D'OR, pure white, yellowish centre, good.

Double Yellow. BOUQUET D'ORANGE, reddish-yellow, medium spike; GOËTHE, pale yellow, good; JAUNE SUPRÊME, pure citron-yellow, very double; LA GRANDEUR, citron, fine spike; OPHIR D'OR, deep yellow, extra; WILLIAM III., fine yellow, good spike.

HYÆNACHNE. A synonym of **Toxicodendron** (which *see*).

HYALINE. Crystalline; transparent, or nearly so.

HYBERNALIS. Of, or belonging to, winter.

HYBERNIA. This is a genus of slender-bodied moths, which are frequently destructive, as larvæ, to the foliage of trees and shrubs. In all species, the female is almost wingless, while the male has wings from 1¼in. to 1½in. in spread. The males have the antennæ more or less pectinated. In colour they are all some shade of brown, often verging to reddish, with darker bars crossing the front wings. Their larvæ belong to the group of Loopers; they are slender, and are always inconspicuous (shades of green or brown) in colour. The moths emerge between October and March, and the females crawl on to the food-plants to lay their eggs. *H. leucophæaria* (Spring Usher) lives on Oak; *H. rupicapraria* (Early) on Hawthorn, Oak, &c.; *H. aurantiaria* (Scarce Umber) on Haw-

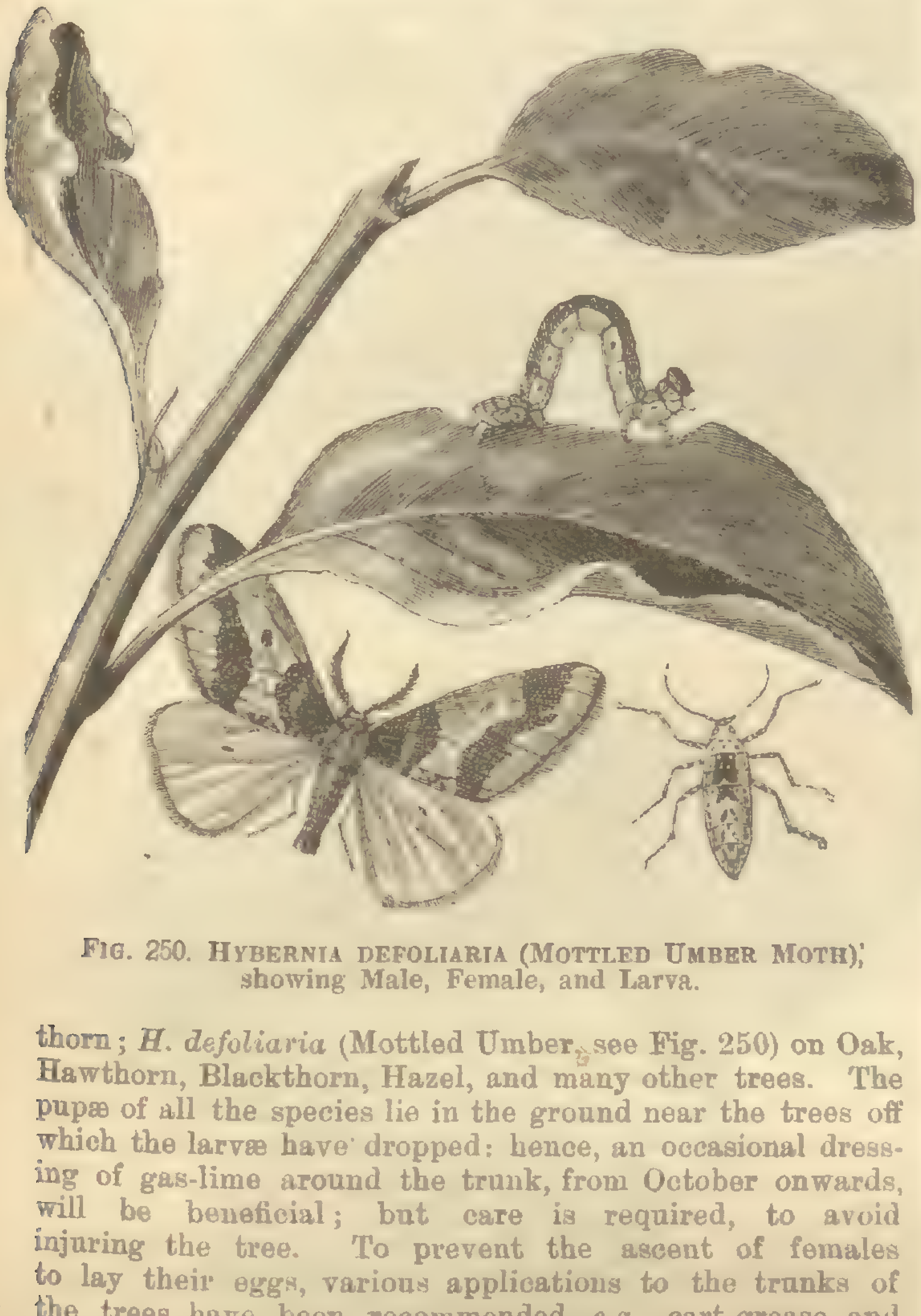


FIG. 250. HYBERNIA DEFOLIARIA (MOTTLED UMBER MOTH), showing Male, Female, and Larva.

thorn; *H. defoliaria* (Mottled Umber, see Fig. 250) on Oak, Hawthorn, Blackthorn, Hazel, and many other trees. The pupæ of all the species lie in the ground near the trees off which the larvæ have dropped: hence, an occasional dressing of gas-lime around the trunk, from October onwards, will be beneficial; but care is required, to avoid injuring the tree. To prevent the ascent of females to lay their eggs, various applications to the trunks of the trees have been recommended, *e.g.*, cart-grease and Stockholm tar, in equal parts; or a rope dipped in a mixture of tar and oil, and tied round the trunk. The larvæ may be cleared off by shaking the branches over cloths spread on the earth around the trees. Care must be taken to remove those hanging by threads, as well as those that have dropped on to the cloths.

HYBRID. A cross between two species.

HYBRIDISING. Most of the so-called Florists' Flowers have been brought up to their present standard of excellence by careful and systematic Hybridisation. The mere operation is easy enough; it is simply necessary to convey the pollen, by means of a camel-hair brush, or otherwise, from the male parent, and place it on the stigmatic surface of the flower of the female, or seed-bearer. Of course, unless the latter is receptive, this proceeding would be ineffective. As a rule, when it is fit to be acted upon by the pollen, the stigma becomes more or less glutinous; in some plants, this condition occurs before their own anthers are ready to discharge the pollen, and in others after the pollen has been shed.

Hybridising—*continued.*

In both these cases, the arrangement is evidently to prevent self-fertilisation. Not a few plants, however, develop stigma and anthers at the same time, and with them it is necessary to remove the anthers before they burst, and, at the same time, by means of fine gauze or otherwise, to prevent the visits of insects, which might convey pollen from another flower, and thus effect an undesirable cross. Continuously working with pollen of certain flowers not unfrequently conduces to sterility, and then a fresh strain must be used, possessing one or more of the qualities it is wished to perpetuate and improve. For instance, a flower of good form, but defective in colour, is, perhaps, crossed with another which is faulty in shape, but of a novel and desirable shade. A weakly-growing variety, of good habit, may be used with effect in combination with a stronger grower lacking the particular qualities present in the former. Sometimes, the florist's ideal has been kept so constantly in sight, that the pollen of a particular strain becomes more or less abortive. More than one very successful raiser of Cyclamens and Gladioli habitually call in the aid of the microscope to determine the state of the pollen in highly-bred seedlings. If this is uneven—not plump, clean and regular—in size and outline, the plant is discarded as a male parent, and another chosen (with perfect pollen) which promises to attain the desired results in size, form, or colour of flower.

Hybrids between two distinct genera are by no means common. A good example is *Philageria* (a cross between the beautiful climbing *Lapageria rosea* and the bushy *Philesia buxifolia*), which is intermediate in character between its two parents, though not nearly so desirable as either. Species of the same genus frequently refuse altogether to cross with each other, and some, again, will only cross one way. No definite rules can be laid down, and exceptions can only be learned by experience.

The following remarks, anent double flowers, are taken from a lecture by the Hon. Marshall P. Wilder, delivered before the Massachusetts Horticultural Society, some thirteen years ago. The gentleman in question is a well-known and very successful hybridiser. "In my experiments, I have discovered that, for the production of double flowers, it is important that the pollen used for impregnation should be borne on a petaloid anther—that is, an anther bearing a small petal—and that this is still better if from a double flower. I also observed, that the larger and better developed this petaloid anther, the better chance for a fine double offspring; for, as might have been expected, the anthers being connected with the corolla, the number of petals would be increased by such an operation. I found, also, that, for the most perfect and symmetrical flowers, it was better to select single flowers, which were the most perfect in their petals, for seed-bearers; and that single or semi-double sorts with perfect corollas, when impregnated with petaloid pollen, will produce double flowers of a regular symmetrical formation. Of this I have the most conclusive evidence in the *Camellia Wilderi*, and many other fine double varieties in my collection, which were produced from the single red and single white Camellias, fertilised by pollen from a petaloid anther of double varieties."

HYDNUM (from *Hydnon*, the old Greek name used by Theophrastus for the Truffle). A genus of about 200 species of hymenomycetous fungi, varying greatly in size and substance, but all distinguished by the fructifying surface (hymenium) consisting of prickles projecting from the cap (pileus). The species are found in all climates, but are most frequent in temperate regions. *H. repandum* (see Fig. 251) is not uncommon in Britain; it occurs in woods, in scattered patches or large rings, and, if properly cooked, affords an excellent article of food. The specimens, which must be perfectly fresh, after being

Hydnum—*continued.*

sliced into hot water, and gently pressed, should be carefully stewed, or rubbed down into a purée.

FIG. 251. HYDNUM REPANDUM.

HYDRANGEA (from *hydor*, water, and *aggeion*, a vessel; in allusion to the cup-shaped fruit). SYN. *Hortensia.* ORD. *Saxifrageæ.* A genus consisting of thirty-three species of greenhouse or hardy, deciduous or evergreen, showy shrubs or trees, natives of Eastern Asia, Java, the Himalayan Mountains, North-west and South-east America. Petals four or five; calyx superior, five-toothed; stamens eight to ten; capsule membranaceous. Leaves opposite, petiolate, persistent or deciduous, entire, serrate, or lobed. Hydrangeas are of easy culture, and are exceedingly ornamental for conservatory, room, or window decoration. They are also well adapted for growing in the open ground, in all the warmer parts of the country. The sorts having abortive or sterile flowers, with an enlarged calyx, are the most ornamental, and are extensively grown. *H. hortensis*, and some of its varieties, have nearly all sterile flowers, and are, consequently, most popular. *H. paniculata grandiflora* is very handsome, and amongst the best, either for pot culture or for outside treatment. The American species are hardier, but not so ornamental, as those from China and Japan. Propagation is readily effected from cuttings of young or partially-ripened shoots, which may be inserted at almost any time when they are procurable. Old plants may also be divided for propagation. For culture outside, a somewhat sheltered position should be selected, except in favourable localities.

Cultivation in Pots. Hydrangeas may be propagated annually to produce one head of flowers each—a method largely practised—or they may be grown as shrubby plants several years in succession. Cuttings should be inserted in small single pots, and plunged in a close, warm frame. They may be taken in spring, from young growths that are not bearing flowers, and be grown on throughout the summer, and well ripened in autumn by exposure outside. Another plan is to let the old plants grow all the season, and put in strong points as cuttings when partially ripened. In this case, the formation of roots only should be encouraged, by plunging in a little bottom heat, but not in an inclosed frame. Select the tops of the strongest and most prominent shoots for cuttings, and insert them in August. When they are rooted, gradually harden off, and expose them to full sunshine and plenty of air in autumn, to insure thorough ripening. When the leaves fade, water should be withheld, and the plants kept dry, in a cool greenhouse, all the winter. In February, or earlier if desired, they may be potted into 5in. or 6in. pots, and started by placing in a higher temperature, and applying more water. The embryo buds, formed the previous autumn, will soon begin to expand; but it is not usual for all

Hydrangea—*continued.*

to flower, as they may not have been sufficiently strong. As a rule, the corymb of flowers appears after the fourth pair of leaves; and should the plant develop so far without the embryo being seen, it may be thrown away, unless required for another year. Late autumn-struck cuttings produce useful dwarf-flowering plants in spring, not exceeding 1ft. in height. Those propagated in spring, and grown on in pots for the next year, are much stronger and taller in proportion. A new stock should be propagated annually, and the old ones thrown away, unless required for bush specimens or for supplying cuttings, when they may be cut down, repotted, and grown on in pots, or be planted out in the open air. Hydrangeas like a rich soil, such as loam and decayed cow or other manure in equal parts. Any quantity of water may be applied in the growing season; and artificial manure, given just as the flowers are developing, invariably proves beneficial. The flowers sometimes turn blue, certain soils having the property of changing the normal colour, in consequence of the presence of some chemical constituent. Water, in which alum has been dissolved, is used artificially to cause the same change in colour. Iron in small quantity, as well as some other substances, mixed with the soil, are said to produce the same effect. In some gardens, plants that produce red flowers one year may develop blue ones the next, and this without any influence or skill on the part of the cultivator.

H. arborescens (tree-like). *fl.* white, small, having an agreeable odour, nearly all fertile; corymbs flattish. Summer. *l.* ovate, rather cordate; upper ones lanceolate, coarsely toothed, pale and puberulous beneath. *h.* 4ft. to 6ft. North America, 1736. Hardy. (B. M. 437.)

FIG. 252. HYDRANGEA HORTENSIS.

H. hortensis (garden).* Common Hydrangea. *fl.* varying much in colour (according to the soil in which the plant is grown), disposed in ample corymbs or cymes, all difformed; fertile flowers few. April to September. *l.* broadly-ovate, serrated, acuminated. *h.* 2ft. to 3ft. China, 1790. SYN. *Hortensia opuloides.* See Fig. 252. The varieties of this species are numerous; one of the most noteworthy being "Thomas Hogg," a form with pure white flowers.

H. h. japonica (Japanese). *fl.* blue, white, difformed; cymes crowded. *l.* ovate-oblong, acuminated, finely and glandularly serrated, glabrous. *h.* 3ft. Japan, 1843. The variety *roseo-alba* has the outer flowers only radiate, and either white or rosy toothed petals; and *cærulescens* has bright blue ray-flowers. There are also forms having leaves with gold and silver variegation.

Hydrangea—*continued.*

H. h. Otaksa (Otaksa).* *fl.* flesh-coloured, nearly all sterile, disposed in large, terminal, globose, leafless cymes. *l.* opposite, cuneate-obovate, deeply serrated. *h.* 2½ft. Japan, 1868. Hardy.

H. h. stellata prolifera (proliferous star-like). *fl.* at first yellowish-green, ultimately rose-colour, sterile; cyme terminal, densely packed. Japan, 1866.

H. h. variegata (variegated) is a variety with very ornamental foliage, particularly when grown as young plants, in heat.

FIG. 253. HYDRANGEA PANICULATA GRANDIFLORA, showing Habit and detached Single Flower.

H. paniculata grandiflora (large-flowered panicled).* *fl.* white, disposed in a large, terminal, leafy panicle, 1ft. long, consisting of [illegible] through-out with sterile ones, more than 1in. across. Summer and autumn. *l.* opposite, or in threes, ovate-oblong, acute, pubescent. Japan, 1874. Hardy. See Fig. 253.

H. petiolaris (petiolar).* *fl.* white, in flat-topped cymes [illegible] April and May. *l.* broadly ovate [illegible] dark green above, paler beneath; stalk pubescent, and nerves bearded in axils. Trunk slender [illegible] like Ivy against its support. Japan, [illegible] conservatory. (B. M. 6788.) Now and then met with in gardens under the name of *Schizophragma hydrangeoides*, a very different plant.

H. quercifolia (Oak-leaved).* *fl.* white, sterile, or outer ones large; [illegible] Summer. *l.* large, ovate, sinuately lobed and toothed, pilose beneath. *h.* 4ft. to 6ft. Florida, [illegible] Half-hardy [illegible] (B. M. [illegible])

H. scandens (climbing). *fl.* white; petals cohering at their tips and [illegible] Japan, [illegible] Plant climbing, half-hardy.

H. Thunbergii (Thunberg's).* *fl.* [illegible], the sterile ones on the circumference, and fertile ones in the centre, of the cyme; cymes terminal [illegible] *l.* opposite, petiolate, ovate-oblong, acute, serrulate. *h.* 2ft. to 3ft. Japan, 1874. Half-hardy. (G. C. 1870, 1699.)

HYDRANGEÆ. A tribe of *Saxifrageæ*.

HYDRASTIS (probably from *hydor*, water, and *drao*, to act; in allusion to the active properties of the juice). ORD. *Ranunculaceæ*. A monotypic genus, the species being a hardy herbaceous perennial. It is of somewhat difficult culture, and must be grown in loam and leaf mould, in a moist situation. Increased by divisions of the root.

H. canadense (Canadian). Orange Root. *fl.* greenish-white, small [illegible] May and June. *l.* rounded, heart-shaped at the base [illegible] doubly serrate [illegible] when full grown, in summer, [illegible] Stem simple, hairy. *h.* 1ft. North America, 1759. (B. M. 3019, 3232.)

HYDRIASTELE (from *hydria*, a water vessel or fountain, and *stele*, a column; in allusion to the tall stems growing near springs). ORD. *Palmeæ*. A monotypic genus, the species being a tall stove palm. For culture, *see* **Kentia.**

H. Wendlandiana (Wendland's). *fl.*, panicle of numerous slender pendulous spikes of about 1ft., the common peduncle very short, broad, and thick, marked with the scars of the spathes and of two outer bracts; spathe and male flowers unknown; female perianth under the fruit, the segments all very broad, the inner twice as long as the outer ones. *fr.* ovoid or globular, when dry longitudinally striate with prominent ribs, succulent when fresh, with a thin endocarp. *l.* many feet long; segments numerous, unequal, the longest 1½ft. long, the upper ones confluent at the base, all or mostly jagged or toothed at the apex. Tropical Australia. SYN. *Kentia Wendlandiana*.

HYDROCHARIDEÆ. A small order of aquatic herbs, widely diffused over the globe. Flowers in spathes, often incomplete; perianth of six segments, the three inner often petaloid. Leaves undivided, floating or submerged, opposite or whorled. There are about fourteen genera and forty species. Examples: *Hydrocharis, Ottelia, Stratiotes, Vallisneria.*

HYDROCHARIS (from *hydor*, water, and *charis*, grace; a pretty water plant). ORD. *Hydrocharideæ*. A monotypic native aquatic genus, spread over Europe and North Asia. The species thrives in any still water. It may be readily increased by seeds; or by runners, which root at the joints.

H. Morsus-ranæ (Frogbit). *fl.* rather large; outer segments of perianth pale green, shorter and narrower than the inner white ones; peduncles of male plant rather short, bearing two or three flowers; pedicel of female enlarged at top into a short perianth tube. Summer. *l.* stalked, orbicular, entire, cordate at base, rather thick, about 2in. in diameter. Stems floating, with floating tufts of leaves, peduncles, and fibrous roots. (Sy. En. B. 1444.)

HYDROLEA (from *hydor*, water, and *elaia*, oil; alluding to the habitat and nature of the plants). SYNS. *Reichelia, Sagonea, Steris.* ORD. *Hydrophyllaceæ*. A genus comprising about fourteen species of herbs or sub-shrubs, inhabiting North and South America, tropical

FIG. 254. FLOWERING STEM OF HYDROLEA SPINOSA.

Africa, the West Indies, the Malayan Archipelago, and tropical Australia. Flowers blue, axillary or terminal; corolla broadly campanulate-rotate, five-fid; lobes imbricated. Leaves alternate, entire. The species require damp, boggy positions to thrive thoroughly.

Hydrolea—*continued.*

H. caroliniana (Carolina). *fl.* blue, one to five together, axillary, almost sessile. Summer. *l.* lanceolate, very acute, 1in. to 3in. long. *h.* 1ft. to 2ft. North Carolina, 1824. SYN. *H. quadrivalvis.*

H. corymbosa (corymbose). *fl.* blue, in a terminal corymbose cyme; sepals linear-lanceolate, villous-hispid. Summer. *l.* lanceolate, nearly sessile, glabrous. *h.* 1ft. to 2ft. South Carolina to Florida.

H. quadrivalvis (four-valved). A synonym of *H. caroliniana.*

H. spinosa (thorny). *fl.* pale blue, terminal, corymbose. June and July. *l.* lanceolate. *h.* 1ft. South America, 1791. See Fig. 254. (B. R. 566.)

HYDROLEÆ. A tribe of *Hydrophyllaceæ.*

HYDROMESTUS. Now included under *Aphelandra.*

HYDROPELTIS (from *hydros*, water, and *pelte*, a buckler; the plant grows in water, and has leaves in the form of a buckler). ORD. *Nymphæaceæ.* A very pretty little hardy aquatic plant, which should be grown in a pond or a cistern of water. Increased by offsets.

H. purpurea (purple). *fl.* purple, closing and lying down on the surface of the water at night; peduncles axillary, one-flowered. Summer. *l.* alternate, on long petioles, oval, peltate, entire, floating. North America, 1798. The correct name of this plant is *Brasenia peltata.* (B. M. 1147.)

HYDROPHYLLACEÆ. A small order of annual or perennial herbs, rarely suffrutescent, natives, for the most part, of North-west America. Flowers chiefly blue or white, in one-sided cymes or racemes, which are mostly bractless and coiled from the apex when young, as in the Borage family. Leaves usually alternate, entire, dentate, or pinnate, hispid. There are sixteen genera and 150 species. Illustrative genera are: *Emmenanthe, Hydrolea, Hydrophyllum, Nemophila, Phacelia.*

HYDROPHYLLUM (from *hydor*, water, and *phyllon*, a leaf; leaves loaded with water in spring time). ORD. *Hydrophyllaceæ.* This genus comprises about six species of erect or diffuse hardy perennial herbs, natives of North America. Flowers white or pale blue, in cymose clusters; corolla bell-shaped, five-cleft. Leaves ample. The species thrive in any ordinary border, in somewhat damp soil. Propagated by divisions, or by seeds.

H. appendiculatum (appendiculate). *fl.* blue; cymes rather loosely-flowered. June and July. *l.*, stem ones palmately five-lobed, rounded, the lobes toothed and pointed; the lowest pinnately divided. *h.* 9in. 1812.

H. canadense (Canadian). *fl.* nearly white, crowded, on very short pedicels; calyx lobes linear-awl-shaped, nearly smooth. June to August. *l.* palmately five to seven-lobed, rounded, heart-shaped at the base, unequally toothed. *h.* 1ft. 1759. (B. R. 242.)

H. virginicum (Virginian). *fl.* blue; calyx lobes narrowly-linear, bristly-ciliate. June to August. *l.* pinnately divided; divisions five to seven, ovate-lanceolate or oblong, pointed, sharply cut-toothed, the lowest mostly two-parted, the uppermost confluent. *h.* 1ft. to 2ft. 1739. (B. R. 331.)

HYDROTÆNIA. A synonym of **Tigridia** (which *see*).

HYEMALIS. Of or belonging to winter. The term is usually applied to plants which flower in winter.

HYGROMETER. For horticultural purposes, the best instrument for ascertaining the degree of humidity in the air is the Dry and Wet Bulb Thermometer. This consists simply of a couple of fine tubes, carefully graduated, containing mercury. The bulb of the one should be covered with thin muslin; and round the neck, and over the muslin, should be twisted loosely, or tied in a loose knot, a conducting thread of lamp wick or some similar material: this must pass into a vessel of water, about 3in. from the bulb, and a little on one side, so that evaporation may not affect the reading of the dry bulb by its too near vicinity. The Hygrometer just described is less complicated and expensive than those in which the dew-point is ascertained by the use of ether, &c.; and, moreover, it allows of continuous observations. Hygrometrical tables, adapted to the use of the Dry and Wet Bulb Thermometer, have been compiled by James Glaisher, F.R.S., and published in pamphlet form.

HYGROMETRICAL. Indicating the approach of moisture.

HYMENÆA (from *Hymen*, the god of marriage; referring to the twin leaflets). Locust-tree. ORD. *Leguminosæ.* A genus comprising eight species of ornamental stove evergreen trees, natives of tropical America. Flowers white, large or medium. Leaves bifoliolate; leaflets coriaceous. Hymenæas will thrive in a compost of peat and rich loam. Firm cuttings will root, during spring, in sand, in bottom heat. The only species yet cultivated is the one here described.

H. Courbaril (Courbaril). Anime Resin. *fl.* yellow, striped with purple. *l.* oblong-ovate, unequal-sided, and unequal at the base, ending in a long acumen. *h.* 40ft. to 60ft. South America, 1688. This tree furnishes a valuable resin, and its timber is of a fine brown colour, hard, and close-grained; it is used for building and other purposes in its native country.

HYMENANDRA (from *hymen*, a membrane, and *aner*, *andros*, a man; the anthers are connected by a membrane). ORD. *Myrsineæ.* A monotypic genus, the species being a stout evergreen shrub, often cultivated in stoves for the sake of its handsome foliage. For culture, *see* **Ardisia** (to which the genus is allied).

H. Wallichii (Wallich's). *fl.* pink, disposed in compound lateral umbels; corollas wheel-shaped, five-parted. *l.* large, leathery glossy, dentate, pellucid-dotted. *h.* 2ft. to 4ft. Western Bengal and Assam.

HYMENANTHERA (from *hymen*, a membrane, and *anther*; anthers terminated by a membrane). SYN. *Solenantha.* ORD. *Violarieæ.* A genus comprising about four species of greenhouse or half-hardy evergreen rigid shrubs or small trees, natives of Australia and New Zealand. Flowers small, axillary, frequently polygamous. Leaves alternate, often clustered, small, entire or toothed, without stipules. The species thrive in two parts sandy peat, and one of fibry loam. Young cuttings root readily in sand, under a bell glass.

H. crassifolia (thick-leaved). *fl.* yellowish, small; pedicels solitary, axillary. Berries white, ¼in. long, oblong-obtuse, very ornamental. *l.* alternate or tufted, linear-spathulate, entire. *h.* 2ft. to 4ft. New Zealand, 1875. Hardy in the South of England. (G. C. n. s., iii. 237.)

H. dentata (toothed). *fl.* yellow, small, axillary; peduncles solitary, one-flowered. April. *l.* from oblong-elliptical to linear, obtuse or acute, coriaceous, sessile or narrowed into a short petiole. *h.* 6ft. New South Wales, 1824. (B. M. 3163.)

HYMENOCALLIS (from *hymen*, a membrane, and *kallos*, beauty; referring to the membranous cup inside the flower). Including *Choretis* and *Ismene.* ORD. *Amaryllideæ.* A genus containing about a score species of stove or greenhouse bulbous-rooted plants, from North and South America and the West Indies. Flowers white, in umbels, very fragrant; perianth tube straight, elongated, scarcely widened at the throat. Leaves usually persistent, lorate. Many species usually classed in gardens under this genus are Pancratiums. The stove species require a strong, loamy soil, well drained, and a liberal allowance of pot-room. The bulbs should be buried just below the surface of the soil, and they must always be kept moist, more especially during the summer. The best of the stove kinds is *H. macrostephana*, which is as useful and beautiful as the Eucharis. The greenhouse species thrive under the above treatment, except that during their resting period (winter) they should be kept dry. A few kinds, which are known in gardens as Ismenes, may be grown in the open border, if sheltered from cold winds, and well drained; but it is only in very favoured situations, in England, that these plants prove satisfactory when grown altogether out of doors. They may, however, be planted out during the summer, and be taken up, and placed in sand, in a shed or frame, for the winter.

H. adnata (adhering-leaved). *fl.* white, with narrow perianth segments, and a deep wavy corona; disposed in umbels. May. *l.* rather broad. *h.* 1ft. South America, 1758. The variety *littoralis* is a handsome greenhouse plant, with pure white flowers

Hymenocallis—*continued.*

3in. to 4in. long, and resembling a Giant Trumpet Narcissus. (B. M. 2621.)

H. Amancaes (Amancaes). *fl.*, corolla bright yellow, large, nutant, salver-shaped; tube green downwards, yellow upwards; segments linear-lanceolate, narrow, distant, stellately expanded; scape compressed, ancipital, even. *l.* reticulately veined, downwards fistularly sheathing for about half the length of the scape. *h.* about 2ft. Chili and Peru. Greenhouse. (B. M. 1224, under name of *Pancratium amancæs.*)

H. amœna (charming).* *fl.* sweet-scented; tube green-white, remainder of the flower white. October. *l.* six to eight, 10in. long, paler beneath, with a thick fleshy midrib. *h.* 1ft. to 2ft. Guiana, 1790. Stove. (B. M. 1467, under name of *Pancratium amœnum.*)

FIG. 255. HYMENOCALLIS ANDREANA.

H. Andreana (André's). *fl.* white, on slender one-flowered scapes, shorter than the leaves; perianth tube green, cylindrical, erect, 4½in. to 5in. long, curved at the top; limb white; segments linear, 3½in. to 4in. long; corona broadly funnel-shaped, nearly 3in. long, 3in. to 4in. at the throat, with green stripes. *l.* linear, pale green, glabrous. *h.* 1½ft. Ecuador, 1876. See Fig. 255. (R. H. 1884, 468; Gn. xxv. 454, under name of *Ismene Andreana.*)

H. Borskiana (Borski's). *fl.* white, with a very thin transparent corona, seven in an umbel. April. *l.* dull green, 2½ft. long. *h.* 1ft. La Guayra, 1845. Stove.

H. calathinum (basket-flowered).* *fl.* white, exceedingly fragrant, about 3in. long, expanding in succession with intervals of from ten to fourteen days; tube and upper part of style green. March and April. *l.* fistularly sheathing, few, two-ranked, striate-nerved, obtuse. Brazil, 1796. Greenhouse. (B. M. 1561, under name of *Pancratium calathinum.*)

H. Choretis (Choretis). *fl.*, tube long, green; limb white; corona white, rotate, with a jagged border; scape three-flowered. August. *l.* strap shaped, erect, glaucous, about 2½in. wide and 6in. long. *h.* 1ft. Mexico, 1837. Stove. SYN. *Choretis glauca.*

H. expansa (expanded). *fl.* sessile, obsoletely three-cornered, pale green, 4½in. long; segments linear. November. *l.* linear-lanceolate, striated. *h.* 2ft. Native country unknown. Stove. (B. M. 1941, under name of *Pancratium expansum.*)

H. Harrisiana (Harris's). *fl.* white; tube very long and slender, surmounted by six very narrow linear white segments, and with a cup-shaped corona from whose border project six green stamens at equal distances; umbels few-flowered. June. *l.* sessile. *h.* 1ft. Mexico, 1838. Greenhouse. (B. M. 6562.)

H. Macleana (McLean's). *fl.* white; perianth yellowish, marked with green; tube slender; limb and style exceeding the corona. June. *l.* broad, arching, deep green. *h.* 2ft. Lima, 1837. Greenhouse, nearly hardy. For an account of this plant and its allies, and their uses by the Peruvians, see Stewart's "Visit to the South Seas," or the long extract from that work given in the "Botanical Magazine," lxv. (B. M. 3675, under name of *Ismene Macleana.*)

H. macrostephana (large-crowned).* *fl.* white, with a green tube, about 3in. long, sweet-scented; umbel six to eight-flowered. February. *l.* broad-lanceolate, 2½ft. to 3ft. long. *h.* 2ft. 1879. Stove. (B. M. 6436.)

Hymenocallis—*continued.*

H. rotata (rotate). *fl.* white; segments of perianth linear-lanceolate; corona spreading, closely toothed; scape two-edged, ten to twelve-flowered, longer than the leaves. May. *l.* linear-oblong, streaked. *h.* 1½ft. Florida, 1803. Greenhouse. (B. M. 827, under name of *Pancratium rotatum.*)

H. speciosa (showy).* *fl.* pure white, very fragrant, especially in the evening; scape shorter than the leaves, compressed, ancipital. *l.* very dark green, from 1½ft. to 2ft. long, and from 3in. to 4in. across the broadest part. West Indies, 1759. A very desirable stove plant. (B. M. 1453, under name of *Pancratium speciosum.*)

H. tenuifolia (narrow-leaved). *fl.* white; corona large, funnel-shaped, nearly as long as the linear perianth segments; scape two-edged, one-flowered. June. *l.* linear. *h.* 9in. Ecuador, 1878. A beautiful greenhouse species. (B. M. 6397, under name of *Ismene tenuifolia.*)

H. virescens (greenish). *fl.* greenish; tube of perianth about equal to the segments; sepals and petals ovate. June to August. *l.* green, rather erect, acute, sheathing at the base. *h.* 1ft. Cusco, 1840. Greenhouse. (B. R. 1841, 12, under name of *Ismene virescens.*)

HYMENODES. Membranous in texture.

HYMENODICTYON (from *hymen*, a membrane, and *dictyon*, a net; seeds girded by a reticulated membrane). SYN. *Kurria.* ORD. *Rubiaceæ.* A genus comprising four or five species of stove trees, natives of Asia and tropical Africa. Flowers small, racemosely panicled. Leaves opposite, petiolate, glabrous or pubescent, deciduous. For culture, *see* **Cinchona.**

H. excelsum (tall). *fl.*, panicles axillary and terminal, large. Summer. *l.* oblong and downy; floral ones coloured and blistered. *h.* 30ft. India, 1820. The bark of this species is very astringent, and is largely used for tanning purposes. (B. F. S. [illegible], under name of *H. utile.*)

HYMENODIUM CRINITUM. A synonym of **Acrostichum crinitum.**

HYMENOLEPIS. Included under *Acrostichum.*

HYMENOPHYLLUM (from *hymen*, a membrane, and *phyllon*, a leaf). Filmy Fern. ORD. *Filices.* A genus of about eighty species of stove or greenhouse, rarely hardy, ferns. Fronds delicately membranaceous, simple or compound, never with anastomosing veins. Sori marginal, more or less sunk in the frond, or exserted; involucre inferior, more or less deeply two-lipped or two-valved, toothed or fringed, or entire; receptacle elongated, columnar, exserted or included. Except where otherwise stated, the species described below require stove treatment. For culture, *see* **Ferns.**

H. abruptum (abrupt). *sti.* about ¼in. long, very slender. *fronds* ½in. to 1in. long, ¼in. to ½in. broad, oblong, pinnatifid nearly to rachis; pinnæ linear, about ¼in. long. *sori* one or two to a frond, terminal on the apex. West Indies and tropical America, 18[illegible]. (H. S. F. i. 31.)

H. æruginosum (verdigris-covered).* *sti.* 1in. to 2in. long, hairy. *fronds* 2in. to 3in. long, about, or scarcely 1in. broad, lanceolate or ovate-acuminate, tripinnatifid; pinnæ often much imbricated, the lower ones flabellate, divided down nearly to the rachis; surface and margin pubescent. *sori* two to twelve, terminal on the segments. Tristan d'Acunha.

H. asplenioides (Asplenium-like). *sti.* 1in. to 2in. long, slender. *fronds* 2in. to 4in. long, ½in. to 1in. broad, pendulous, oblong in general outline, pinnatifid nearly to rachis. *sori* one to four, terminal on the segments. Tropical America, 1859.

H. bivalve (two-valved). *sti.* 2in. to 4in. long, wiry. *fronds* ovate-triangular, tripinnatifid, 3in. to 5in. long, 2in. to 3in. broad; lower pinnæ triangular-acuminate; ultimate segments linear, two to three lines long, spinuloso-dentate. *sori* very numerous, often six to eight on a single pinnule. New Zealand. (H. S. F. i. [illegible])

H. Boryanum (Bory's). A synonym of *H. ciliatum.*

Hymenophyllum—*continued.*

H. caudiculatum (tailed). *sti.* 4in. to 6in. long, wiry, broadly winged above. *fronds* 6in. to 12in. long, 2in. to 3in. broad, ovate-acuminate, tripinnatifid; lower pinnæ rhomboidal-lanceolate, erecto-patent, divided down to the rachis. *sori* two to twelve to a pinna, placed at the apex of the segments on both sides. Brazil, Peru, and Chili.

H. ciliatum (ciliated).* *sti.* 1in. to 2in. long, ciliately and decurrently winged above. *fronds* oblong, acuminate, tripinnatifid, 2in. to 6in. long, 1in. to 2in. broad at the centre; lower pinnæ oblong or rhomboidal, with a broad central undivided portion. *sori* two to twelve on a pinna, placed at the end of the lateral segments on both sides. Tropical regions of both hemispheres, 1859. SYN. *H. Boryanum*, *H. Plumieri*.

H. crispatum (curled). A synonym of *H. javanicum*.

H. demissum (hanging down).* *sti.* 4in. to 6in. long, erect, firm. *fronds* 4in. to 12in. long, 3in. to 4in. broad, ovate-triangular, three or four times pinnatifid; lower pinnæ 2in. to 3in. long, triangular-rhomboidal, divided nearly to the rachis. *sori* twenty to thirty to a pinna, terminal and axillary in the segments on both sides. New Zealand, Philippines, &c., 1858. Greenhouse.

H. dilatum (swollen). *sti.* 2in. to 4in. long, erect, wiry. *fronds* 6in. to 12in. long, 4in. to 6in. broad, ovate-lanceolate, tripinnatifid; lower pinnæ rhomboidal-lanceolate, divided nearly to the rachis. *sori* two to twelve to a pinna, terminal or axillary on the segments on both sides. New Zealand. Greenhouse.

FIG. 256. HYMENOPHYLLUM FALKLANDICUM.

H. falklandicum (Falkland Islands). *sti.* ½in. to ¾in. long, filiform. *fronds* oblong, pinnatifid, 1in. to 2in. long, ⅛in. to ½in. broad; pinnæ erecto-patent, sessile, upper simple, lower deeply bifid or trifid; lobes ciliate-dentate. *sori* solitary. Falkland Islands. Greenhouse. See Fig. 256.

H. fimbriatum (fringed). A synonym of *H. javanicum*.

H. flabellatum (fan-like). *sti.* 2in. to 4in. long, firm, erect. *fronds* 4in. to 12in. long, 2in. to 4in. broad, ovate-acuminate, tripinnatifid, flaccid; lower pinnæ 1in. to 2in. long, broadly rhomboidal-acuminate, divided to the rachis. *sori* six to twenty to a pinna, terminal on the lateral segments. Australia, New Zealand, &c., 1859. Greenhouse. SYN. *H. nitens*.

H. flexuosum (flexuous). A synonym of *H. javanicum*.

H. hirsutum (hairy).* *sti.* 1in. to 2in. long, slender. *fronds* linear-oblong, once pinnatifid, 2in. to 6in. long, about ½in. broad, slender, flaccid, often pendulous, hairy over the surface; pinnæ short, close. *sori* one to four on a pinna. South America, Madagascar, 1823.

H. hirtellum (small-haired). *sti.* 1in. to 4in. long, tomentose. *fronds* ovate-acuminate, tripinnatifid, 3in. to 6in. long, 2in. to 3in. broad; lower pinnæ rhomboidal-lanceolate, with a narrow central undivided portion; lower pinnules pinnatifid, with long, narrow-linear ciliated segments. *sori* two to twelve to a pinna, placed at the end of the lateral segments on both sides. West Indies, Mexico, &c., 1859. (H. S. F. i. 31D.)

H. javanicum (Javanese). *sti.* 2in. to 4in. long, erect, margined above with a broad crisped wing. *fronds* 4in. to 8in. long, 3in. to 4in. broad, triangular, tripinnatifid; lower pinnæ 1½in. to 2in. long, triangular-rhomboidal, divided down to a narrow crisped centre. *sori* six to twenty to a pinna, terminal and axillary on the segments on both sides. India to Australia, &c. Greenhouse. SYNS. *H. crispatum*, *H. fimbriatum* (H. S. F. i. 36), *H. flexuosum*.

H. nitens (shining). A synonym of *H. flabellatum*.

H. Plumieri (Plumier's). A synonym of *H. ciliatum*.

FIG. 257. HYMENOPHYLLUM TUNBRIDGENSE.

H. polyanthos (many-flowered).* *sti.* 2in. to 3in. long, slender. *fronds* 2in. to 8in. long, 1in. to 3in. broad, ovate-oblong, tripinnatifid; lower pinnæ triangular-rhomboidal, divided down to a narrow centre. *sori* two to twelve to a pinna, terminal or axillary on the segments of both sides. Tropics, 1824. SYN. *H. protrusum*. (H. S. F. i. 37B.)

H. protrusum (protruded). A synonym of *H. polyanthos*.

H. pulcherrimum (very pretty).* *sti.* 3in. to 4in. long, wiry, erect, winged down to the base. *fronds* 6in. to 12in. long, 4in. to 6in. broad, ovate-triangular, three or four-pinnatifid; lower pinnæ 2in. to 3in. long, lanceolate-rhomboid. *sori* numerous, axillary and terminal on the segments of both sides. New Zealand. Greenhouse.

FIG. 258. HYMENOPHYLLUM UNILATERALE, showing Habit, and detached Pinna with Involucre.

H. rarum (rare). *sti.* very slender, 1in. to 3in. long. *fronds* flaccid, pendent, 2in. to 6in. long, 1in. to 2in. broad, oblong, bipinnatifid; pinnæ simple, linear or forked or pinnatifid. *sori* large, terminal on the segments of the upper pinnæ. New Zealand to Cape Colony. Greenhouse.

Hymenophyllum—*continued.*

H. scabrum (rough). *sti.* 2in. to 4in. long, wiry, ciliated. *fronds* 6in. to 15in. long, 2in. to 5in. broad, ovate-acuminate, tripinnatifid; lower pinnæ 2in. to 3in. long, oblong-rhomboidal, acuminate, divided nearly to the rachis. *sori* six to twenty to a pinna, terminal on the lateral segments on both sides. New Zealand, 1859. Greenhouse.

H. sericeum (silky). *sti.* 2in. to 4in. long, wiry. *fronds* pendent, 6in. to 24in. long, 2in. to 3in. broad, elongate-oblong, obtuse or acuminate, simply pinnatifid; pinnæ 1in. to 2in. long, numerous, opposite, very variable in division. *sori* numerous to a pinna, small, terminal on the apex of the pinnæ and lateral segments. Tropical America, 1859.

H. tunbridgense (Tunbridge).* *sti.* ½in. to 1½in. long. *fronds* oblong-lanceolate, 1in. to 3in. long, ½in. to 1in. broad, pinnate throughout; pinnæ distichous, flabellato-pinnatifid; lobes linear, one to three lines long, spinulose, serrated, as is also the compound involucre. Temperate regions (Britain). Hardy. See Fig. 257.

H. unilaterale (one-sided) This differs from *H. tunbridgense* in the more ovoid and turgid involucre, in the darker green and more rigid fronds, with the pinnæ pinnatifid on the upper side chiefly. Britain. See Fig. 258. Hardy. SYN. *H. Wilsoni.*

H. Wilsoni (Wilson's). A synonym of *H. unilaterale.*

HYMENOPTERA. A large and most important order of insects, distinguished by the possession of four membranous naked wings, supported by a network of nervures, and of a mouth furnished with jaws for biting. They undergo a complete metamorphosis, their larvæ being usually like maggots, without feet, but with a distinct head; their pupæ are inclosed in a cocoon, and are helpless, but the limbs lie free from the body, not adherent to it, as in the Lepidoptera. The insects are seldom of large size, but they are very numerous, and of very varied habits. The more important groups to horticulturists are the following: 1. Sawflies, or *Tenthredinidæ.* In these, the female has a saw to bore a secure place for depositing the eggs in leaves or branches. The larvæ feed on plants, and have six horny legs, and often several fleshy legs, or prolegs, behind, so that they often resemble larvæ of moths. In the perfect insects, the abdomen and the thorax are closely joined, without any distinct stalk between them. Some of them make true galls on leaves and twigs of Willows. 2. In this class the females possess an ovipositor, and the abdomen is fixed to the thorax by a distinct stalk. The larvæ are footless, and, except in one group, are parasitic in or on other insects: hence they are frequently beneficial. In this section are included the very abundant groups of the Ichneumons and the Chalcides, both parasitic, and the Gall-flies (*Cynipidæ*), which are, in part, makers of true galls on Oaks, Roses, &c., and in part parasites. 3. The Sting-bearers (or Aculeate Hymenoptera). In these, the females usually possess a sting connected with a poison-gland, which they use as a weapon of defence. The antennæ are simple, and are formed of thirteen joints in the males, and of twelve in the females. The larvæ are footless, and are usually supplied with food brought by the perfect insects. The habits of the members of this section are extremely various. Some are solitary, and dig or build cells for the reception of their eggs, which they surround with food for the larvæ—either honey or pollen, or small insects, stung, so as to remain helpless, though alive, till eaten by the larvæ. Among these are the Solitary Wasps and Solitary Bees. Others live in societies (Honey Bees, Humble Bees, Wasps, and Ants), often very numerous, and with a very complex organisation. Often, in a community, there are perfect males, perfect females, and undeveloped females or workers, also called neuters. The workers do the work of the rest, and some may even be modified specially as soldiers, to fight in defence of the community. The Bees are of special importance to many plants, because of the great part they play in securing the fertilisation of flowers, and thereby insuring the production of the seed. *See* **Galls, Honey Bee, Humble Bee, Ichneumon Flies,** and **Sawflies.**

HYMENOSTACHYS. Included under **Trichomanes** (which *see*).

HYOPHORBE (from *hys*, *hyos*, a hog, and *phorbe*, food; probably on account of the fruits being eaten by pigs). ORD. *Palmæ.* A genus of three species of ornamental, middle-sized stove palms, natives of the Mascarene Islands. Flowers white, diœcious, produced in spikes. Berries one-seeded, olive-like. Leaves terminal, pinnate. Trunk unarmed. For culture, *see* **Areca.**

H. amaricaulis (bitter-stemmed).* *l.* pinnate, erect when young, ultimately spreading from 4ft. to 6ft. in length; pinnæ stout, broad, closely set together, about 2in. broad, acuminated. Trunk and petioles very stout, deep maroon, glaucous, with an orange line extending along the outer edges of the midrib. Mauritius, 1866. SYN. *Areca speciosa.* (I. H. 462, 3.)

H. Commersoniana (Commerson's). A synonym of *Chrysalidocarpus lutescens.*

H. indica (Indian). A synonym of *Chrysalidocarpus lutescens.*

FIG. 259. HYOPHORBE VERSCHAFFELTII.

H. Verschaffeltii (Verschaffelt's).* *l.* pinnate, 4ft. to 6ft. long, nearly erect, gracefully arching at the top; pinnæ linear-lanceolate, acuminate, 1½ft. to 2ft. long, 1in. broad; midribs white. Sheath of the leaves forming a triangular columnar stem. Rodriquez. A splendid species. See Fig. 259. (G. C. 1870, 418.)

HYOSCYAMUS (from *Hyos Kyamos* (Hog's Bean), the ancient Greek name used by Hippocrates). Henbane. ORD. *Solanaceæ.* A genus comprising about nine species of biennial or perennial erect herbs, inhabiting warm and temperate Europe, Africa, and Asia. Corolla obliquely campanulate or shortly funnel-shaped, five-lobed. Capsule inclosed in the enlarged calyx, bursting when ripe round a circular raised ring, immediately below the hardened top. The species are of no particular horticultural value, and the only one worth including, chiefly for its medicinal properties, is *H. niger.*

H. niger (black). *fl.* very shortly stalked; corolla pale dingy yellow, with purplish veins. Summer. *l.* rather large, sessile; the upper ones stem-clasping, ovate, and regularly pinnatifid. *h.* 1ft. to 2ft. Europe (Britain), North Africa, North and West Asia, India. (B. M. Pl. 194.)

HYOSPATHE (from *hys*, *hyos*, a hog, and *spathe*: it is known in Brazil as Hog's Palm). ORD. *Palmæ.* A genus comprising three species of reed-like, unarmed, stove palms, natives of Brazil. Flowers green, minute;

Hyospathe—*continued.*

spadices two or three, shortly pedunculate; spathes two, lower one compressed, two-keeled; upper one fusiform. Leaves few, terminal, irregularly pinnatisect; segments broad. The species best known is *H. elegans*. For culture, *see* **Bactris.**

H. elegans (elegant). *fl.*, spikes produced below the leaves, and bear both male and female flowers. *fr.* violet, resembling an olive in shape. *l.* 3ft. to 4ft. long, nearly entire when young, having only a division at the point, but when full-grown they are more or less divided, and become irregularly pinnate. Para. The leaves of this plant are employed for thatching.

HYPECOUM (from *hypecoon*, the old Greek name used by Dioscorides). Including *Chiazospermum*. SYN. *Mnemosilla*. ORD. *Papaveraceæ*. A genus of four (or perhaps five) species of glaucous hardy annual herbs, natives of Southern Europe, Northern Africa, and temperate Asia. Hypecoums thrive in any ordinary garden soil. Propagated by seeds, sown in the open border, in spring, for summer flowering; or in autumn for early spring flowering. The species best known to cultivation is *H. procumbens*.

H. procumbens (procumbent). *fl.* bright yellow; scapes several, erect when in flower, but becoming procumbent when in fruit. Spring and summer. Pods flat, falcate, taper-pointed. *l.* glaucous, smooth; radical ones several, petiolate, pinnately multipartite; leaflets bipinnatifid; stem leaves with shorter footstalks and less divided. *h.* 1ft. South Europe, 1596. (S. B. F. G. 217.)

HYPERANTHERA. A synonym of **Moringa** (which *see*).

HYPERICINEÆ. An order of herbs, shrubs, or rarely trees, comprising eight genera and 210 species, generally distributed over the world, both in temperate and warm climates. Flowers usually yellow or white, terminal, panicled or in dichotomous cymes, rarely axillary; sepals five, rarely four, imbricate; petals the same, hypogynous, imbricate, often twisted. Leaves opposite or rarely whorled, simple, penninerved, entire, or with glandular teeth, usually sprinkled with pellucid glands sunk in the parenchyma, and edged with vesicular black glands. Many of the species yield a yellow juice and an essential oil; some are purgative, others tonic and astringent. Illustrative genera are: *Ascyrum*, *Harongu*, and *Hypericum*.

HYPERICOPSIS. Included under **Frankenia** (which *see*).

HYPERICUM (the old Greek name, used by Dioscorides). Including *Androsæmum*, *Elodea* (of Spach), *Sarothra*, and *Tridia*. ORD. *Hypericineæ*. A genus comprising 160 species of greenhouse or hardy, evergreen or deciduous herbs, shrubs, or sub-shrubs, broadly dispersed over the whole world, but particularly abundant in Southern Europe, Western Asia, and North America. Flowers usually yellow, variously disposed, but rarely umbellate. Leaves opposite, sessile or sub-sessile, usually full of pellucid and black dots on their edges. All the species are of simple culture in almost any ordinary garden soil, but a sandy loam is generally preferable. A winter top-dressing for the more ornamental perennial sorts will be found of great advantage. Propagation may be quickly effected by seeds, by cuttings, or by strong pieces of the creeping-rooted species. Flowers yellow, and plants deciduous, except where otherwise stated.

H. ægyptiacum (Egyptian). *fl.* small, few, almost sessile. June. *l.* glaucous, small, ovate, crowded, dotless. Stem round. *h.* 6in. to 18in. North Africa and Levant, 1787. Half-hardy evergreen. (B. M. 6481.)

H. Androsæmum (Androsæmum). Sweet Amber; Common Tutsan. *fl.* large, terminal, stalked. Summer. *l.* sessile, ovate, sub-cordate, minutely dotted. *h.* 3ft. Europe (Britain). Sub-shrubby. See Fig. 260.

H. Ascyron (Ascyron). St. Peter's Wort. *fl.* very large, few. July. *l.* stem-clasping, lanceolate, acute, full of pellucid dots. Stem tetragonal, simple. *h.* 3ft. Siberia, 1774. Hardy perennial.

H. balearicum (Balearic).* *fl.* large, few. March to September. *l.* ovate, obtuse, rather stem-clasping. Stem quadrangular,

Hypericum—*continued.*

warted. *h.* 1ft. to 2ft. Majorca, 1714. Greenhouse evergreen shrub. (B. M. 137.)

H. calycinum (large-calyxed).* Aaron's Beard; Rose of Sharon. *fl.* large, terminal, solitary. Summer. *l.* ovate, coriaceous, broad, full of pellucid dots. Stem tetragonal, dwarf. *h.* 1ft. South-east Europe (naturalised in Britain). One of the handsomest shrubs; nearly evergreen. (B. M. 146.)

H. Coris (Coris-leaved). *fl.* about ¾in. across. May to September. *l.* in whorls, linear, with revolute margins. Stem shrubby, erect, round. *h.* 6in. to 24in. Levant, 1640. Half-hardy evergreen (B. M. 6563.)

H. elatum (tall). *fl.* corymbose; peduncles bibracteate. July. *l.* ovate-oblong, acute, dilated at the base, somewhat emarginate, with the margins rather revolute. Young stems reddish. *h.* 5ft. North America, 1762. Hardy shrub. (Sy. En. B. 265.)

H. elegans (elegant).* *fl.* racemose. Summer. *l.* ovate-lanceolate, rather stem-clasping, bluntish, full of pellucid dots. Stem erect, winged, full of black dots. *h.* 1ft. Siberia, 1817. An elegant hardy perennial.

H. elodes (marshy). *fl.* pale yellow, with green ribs, expanding in the sun only; panicle loose, few-flowered. Summer. *l.* roundish-ovate, blunt, shaggy, tomentose, full of pellucid dots. Stem villous, round, procumbent. West Europe (Britain), Azores. A very pretty herbaceous plant for boggy places. (Sy. En. B. 276.)

FIG. 260. HYPERICUM ANDROSÆMUM, showing Habit and detached Flower.

H. empetrifolium (Empetrum-leaved).* *fl.*, petals without glands. Summer. *l.* linear, tern, with revolute margins. Stem suffruticose, with slender, erect, four-angled branchlets. *h.* 6in. to 12in. South Europe, 1820. Half-hardy evergreen. (B. M. 6764.)

H. hircinum (goat-scented). Goat-scented St. John's Wort. *fl.* large, few; peduncles bibracteate; styles very long. Summer. *l.* somewhat emarginate at the base, dilated, sessile, ovate-lanceolate, with glandular margins. Branches winged. *h.* 2ft. to 4ft. Mediterranean region, 1640. Hardy shrub. (Sy. En. B. 266.)

H. Hookerianum (Hooker's).* *fl.* few, large. Summer. *l.* elliptical-lanceolate, crowded, with the margins a little revolute, full of fine pellucid dots. Stem round, shrubby. *h.* 2ft. Nepaul, 1823. Half-hardy evergreen. (B. M. 4949, under name of *H. oblongifolium.*)

H. japonicum (Japanese). *fl.* solitary, loosely panicled, small; peduncles solitary or tern. Spring. *l.* broad-ovate or oval, mucronate, obtuse, with revolute edges, full of pellucid dots. Stem weak, tetragonal, smooth, decumbent. *h.* 1ft. Japan, 1823. Hardy perennial.

H. Kalmianum (Kalm's). *fl.* three to seven in a terminal corymb. June. *l.* linear-lanceolate. Branches tetragonal. *h.* 2ft. to 4ft. North America, 1759. Hardy shrub.

H. nummularium (Moneywort-leaved). *fl.* racemose. Summer. *l.* orbicular, stalked. Stem round, ascending. *h.* 3in. to 6in. Pyrenees, &c., 1823. Hardy perennial.

H. oblongifolium (oblong-leaved). A synonym of *H. Hookerianum.*

GENTIANA VERNA.

Hypericum—*continued.*

H. olympicum (Olympian). *fl.* large, few; peduncles bibracteate. Summer. *l.* elliptical-lanceolate, rather acute, full of pellucid dots, glaucous. Stem round, shrubby. *h.* 1ft. to 2ft. Mount Olympus, 1706. Greenhouse evergreen.

H. orientale (Eastern). *fl.* appearing in summer. *l.* stem-clasping, linear, obtuse, erect, fringed with glandular hairs. Stem shrubby, slender, with two angles, erect and jointed. *h.* 6in. to 12in. Levant. Half-hardy perennial.

H. patulum (spreading).* *fl.* corymbose; peduncles bibracteate. Summer. *l.* ovate-lanceolate, acute, tapering to the base, with revolute margins, without dots. Stem round, purplish, herbaceous. *h.* 6ft. Japan. Hardy. (B. M. 5693.)

FIG. 261. DEHISCING CAPSULE AND PORTION OF INFLORESCENCE OF HYPERICUM PERFORATUM.

H. perforatum (perforated).* Common Hypericum; St. John's Wort. *fl.* bright yellow, in a handsome terminal corymb; sepals lanceolate, pointed, quite entire, but with a few glandular lines or dots; petals marked with black dots. Summer and autumn. *l.* sessile, oblong, marked with pellucid dots and occasionally a few black ones on the under side. *h.* 1ft. to 3ft. Temperate regions of Northern hemisphere (Britain). Hardy perennial. See Fig. 261. (Sy. En. B. 258.)

H. prolificum (prolific). *fl.* few, corymbose. Summer. *l.* linear-lanceolate, with revolute edges, full of pellucid dots. Stem round, shrubby; branches angular. *h.* 1ft. to 2ft. North America, 1758. Hardy.

H. pyramidatum (pyramidal). *fl.* few, large; peduncles short, thick. Summer. *l.* stem-clasping, oblong-lanceolate, acute, with revolute margins. Stem winged, herbaceous. *h.* 4ft. North America, 1764. Hardy.

H. triflorum (three-flowered). *fl.* solitary; peduncles terminal, usually in threes. Summer. *l.* membranous, ovate-oblong, bluntish, full of pellucid dots. Stems terete, shrubby. Mountains of Java. Half-hardy. (Gn. xxiii. 158.)

H. uralum (Urala). *fl.* terminal, somewhat corymbose. Summer. *l.* elliptical, mucronulate, smooth, shining. Branches compressed, two-edged. *h.* 2ft. Nepaul. Hardy shrub. (B. M. 2375.)

HYPHÆNE (from *hyphaino*, to entwine; alluding to the fibres of the fruit). Doom, Doum, or Gingerbread Palm. ORD. *Palmæ*. A genus of about nine species of fan-leaved stove palms, natives of tropical Africa, Arabia, and the Mascarene Islands. Flowers diœcious; males in twos, females solitary. Leaves terminal, orbicular, or nearly so, with sword-shaped acute or bifid segments. Stems unarmed, tall or of medium height, simple or

Hyphæne—*continued.*

dichotomously branched. Probably the only species in cultivation is *H. thebaica*, a plant which is difficult to cultivate. It thrives best in rich sandy loam, and may be increased by imported seeds.

H. thebaica (Theban). *l.* large, fan-shaped, in a terminal tuft, whence arises the branched inflorescence. Stem branched, each branch ending in a tuft of leaves. *h.* 40ft. Upper Egypt and Nubia, 1828. The wood of this tree is extremely hard, and is employed in the manufacture of various domestic utensils. (F. d. S. 2152-3.)

HYPOCALYMMA (from *hypo*, under, and *kalymma*, a veil; calyx falling off like a veil or cape). ORD. *Myrtaceæ*. A genus containing twelve species of ornamental greenhouse evergreen shrubs, limited to Western Australia. Flowers axillary, in pairs, or rarely three or four together in each axil, sessile or shortly pedunculate, with three scarious bracts or bracteoles under each flower. Leaves opposite, usually larger than in *Bæckea*, entire, or with crisped edges. The species require a compost of loam and peat, to which a little sand is added. Cuttings of young shoots will root in sand, under a bell glass. Probably the two species here described are the only ones yet introduced.

H. angustifolium (narrow-leaved). *fl.* white or pale pink, in sessile pairs, but often in the axil of one only of each pair of leaves. May. *l.* narrow-linear, rigid, channelled above or semi-terete, rarely rather broader and concave, obtuse or acute. *h.* 1ft. to 3ft. 1843. SYN. *H. suave* (under which name it is figured in B. R. 1844, 28).

H. robustum (robust). *fl.* pink, axillary, on short pedicels; heads many-flowered. May. *l.* linear-lanceolate, mucronate. *h.* 2ft. 1842. (B. R. 1842, 8.)

H. suave (sweet). A synonym of *H. angustifolium*.

HYPOCALYPTUS (from *hypo*, under, and *kalypto*, to hide; named from a covering to the unopened flower, observable in most of the species so-called by Thunberg, but which are now referred to *Podalyria*; the character does not seem applicable to the only species that remains in the genus). ORD. *Leguminosæ*. A monotypic genus. The species is an ornamental greenhouse evergreen shrub, thriving in a peat and loam compost. Cuttings of the side shoots will root, during April, in sand, under a hand glass.

H. obcordatus (obcordate).* *fl.* purple. June and July. *l.* trifoliolate; leaflets obcordate, mucronate. *h.* 1ft. to 3ft. Cape of Good Hope, 1823. (B. M. 1913; B. R. 128; B. M. 3894, under name of *Crotalaria purpurea*.)

HYPOCRATERIFORM. Salver-shaped; having a long slender tube and a flat limb, as in the Primrose.

HYPOCYRTA (from *hypo*, under, and *kyrtos*, curved, gibbous; the under part of the corolla tube exhibits a conspicuous gibbosity). ORD. *Gesneraceæ*. A genus comprising about ten species of much-branched stove shrubs, natives, for the most part, of Brazil. Flowers axillary and solitary, or several together; calyx deeply five-parted. Leaves opposite, entire, or sub-dentate. For culture, *see* **Gesnera.**

H. glabra (smooth). *fl.*, corolla rich scarlet, with a short constriction at the base of the tube; limb orange-yellow; calyx segments serrated; peduncles one to three, in the axils of the leaves, longer than the petioles, with a pair of linear bracts at the base. June and July. *l.* opposite, elliptical, obtuse, glossy, very minutely hairy, on short petioles. Stem dark purple, erect, unbranched, succulent. *h.* 8in. to 10in. South America, 1846. (B. M. 4346.)

H. strigillosa (strigillose). *fl.* scarlet, yellow, axillary, solitary; corolla much swollen in front; limb contracted, five-toothed. May. *l.* oblong, acuminate, mucronate, strigillose. Stem erect, villous above. *h.* 2ft. Brazil. (B. M. 4047.)

HYPODEMATIUM. A synonym of **Lissochilus** (which *see*).

HYPODERRIS (from *hypo*, under, and *derris*, a skin: in reference to the cover of the circular sporange). ORD. *Filices*. A genus of two species of stove ferns, closely allied to *Woodsia*. Sori sub-globose, in lines or series parallel with the secondary veins; involucre calyciform, fimbriated at the margin. Probably the second species,

Hypoderris—*continued.*

H. Seemannii, a native of Nicaragua, has not yet been introduced. For general culture, *see* **Ferns.**

H. Brownii (Brown's). *fronds* simple, sub-cordate, hastate, costate, pinnately veined, 10in. to 12in. long. Trinidad.

HYPOESTES (from *hypo*, under, and *estia*, house; referring to the bracts covering the calyx). ORD. *Acanthaceæ.* This genus comprises about forty species of ornamental stove evergreen shrubs or herbaceous perennials, natives of Southern and tropical Africa, Madagascar, West Indies, China, the Malayan Archipelago, and Australia. Flower-heads often sessile, or shortly pedicellate. Leaves entire or dentate. The species require similar treatment to **Justicia** (which *see*).

H. aristata (awned). *fl.* in axillary clusters, which, being more crowded upwards, are there disposed in stout terminal spikes, inclosed singly, or in pairs or threes, in an involucre of two lanceolate, concave bracts, which terminate in long awns; corolla rose-purple; tube pubescent, expanding into a narrowly campanulate throat; lips shorter than the tube; lateral lobes striped, and the middle one spotted with purple. February. *l.* petioled, ovate, acute, membranous, dark green, faintly pubescent above, and still more so beneath. *h.* 2ft. to 3ft. South Africa, 1874. An erect branched herb. (B. M. 6224.)

H. involucrata (involucrate). *fl.* white; racemes axillary, erect, shorter than the leaves. July and August. *l.* lanceolate, toothed. Stem hairy. *h.* 1½ft. India, 1811. Herb.

H. purpurea (purple). *fl.* purple; spikes axillary and terminal. May and June. Branches pubescent. *h.* 2ft. China, 1822. Herb.

H. sanguinolenta (blood-veined).* *fl.* pale purple, with a white throat, and darker markings of purple on the white; sepals narrow, ciliate, shorter than the corolla tube; corolla resupinate; tube slender, curved. *l.* oblong or obovate-oblong, obtuse, narrowed into a rather broad petiole, entire, the margin waved a little, pubescent on both surfaces; veins conspicuously marked with pale purple bands. Stems pubescent. *h.* 6in. to 12in. Madagascar. Herb. (B. M. 5511.)

HYPOGÆOUS. Growing under the earth.

HYPOGYNOUS. Growing from below the base of the ovary.

HYPOLEPIS (from *hypo*, under, and *lepis*, a scale; so called from the marginal covering of the inferior sporange). ORD. *Filices.* A genus of about a dozen species of stove or temperate ferns. Sori marginal, small, sub-globose, uniform, distinct; involucre same shape as sorus, and covering it, formed out of the reflexed margin. For general culture, *see* **Ferns.**

H. Bergiana (Berg's).* *sti.* tufted, 2ft. long, erect, tomentose. *fronds* 1ft. to 1½ft. long, 6in. to 9in. broad, deltoid, quadripinnatifid; pinnæ deltoid; pinnules ovate-deltoid; segments cut down to the rachis. *sori* very small. South Africa, &c., 1874. Greenhouse.

H. californica (Californian). *sti.* densely tufted, about 6in. long, erect. *fronds* small, densely tufted, about 3in. each way, deltoid, quadripinnatifid; lower pinnæ deltoid; pinnules of the lower side much larger than the others. *sori* roundish, two to six to a segment. California. Greenhouse. (H. S. F. ii. 88A.)

H. distans (distant).* *sti.* 6in. high, slender, flexuose. *fronds* about 1ft. long, 4in. to 5in. broad, ovate-lanceolate, bipinnate; pinnæ spreading, at right angles with the rachis; pinnules oblong, cut half-way down. *sori* small, two to four to a pinnule. New Zealand, 1861. Greenhouse.

H. repens (creeping). *sti.* 1ft. to 2ft. long, strong, erect, more or less prickly. *fronds* 3ft. to 4ft. long, quadripinnatifid; lower pinnæ 1ft. to 2ft. long, 6in. to 12in. broad, ovate-acuminate; pinnules lanceolate; segments cut nearly to the rachis. *sori* two to six to a segment. Tropical America, 1824. Stove. (H. S. F. ii. 90C.)

H. tenuifolia (slender-fronded). *sti.* 1ft. long, erect. *fronds* 4ft. to 5ft. long, quadripinnatifid; lower pinnæ ovate-acuminate, 1ft. to 1½ft. long, 6in. to 9in. broad; pinnules lanceolate. *sori* two to six to an ultimate division. Java to Australia, 1824. Stove. (H. S. F. ii. 89C, 90A.)

HYPOLYTRUM (from *hypo*, beneath, and *elytron*, a sheath; in reference to the two or three small scales included within the larger one). ORD. *Cyperaceæ.* A genus containing about twenty-five species, widely distributed over all tropical and sub-tropical regions. Few of the species are, or ever have been, in cultivation in this country; the only one worthy of mention in this work being *H. latifolium*, a handsome, sedge-like, herbaceous

Hypolytrum—*continued.*

stove plant, suitable for table decoration, &c. It prefers a sandy loam and peat compost. Shade and moisture are essential elements in its culture. Propagated by seeds, or by cuttings.

H. latifolium (broad-leaved).* *fl.* of a rich brown colour, disposed in rather dense terminal clusters. *l.* broad-lanceolate. *h.* 2ft. to 4ft. Ceylon, 1877. (B. M. 6282.)

HYPOMENOUS. Free; not adherent.

HYPOPHYLLOUS. Growing on the under side of a leaf.

HYPOXIDEÆ. Now regarded, by Bentham and Hooker, as a tribe of *Amaryllideæ.*

HYPOXIS (from *hypo*, beneath somewhat, and *oxys*, sharp; referring to the base of the capsule). ORD. *Amaryllideæ.* A genus of greenhouse or nearly hardy dwarf-growing herbaceous perennial plants, not bulbous. Flowers yellow, star-shaped. Leaves grass-like. Hypoxis thrive in sandy loam and peat or leaf mould; and may be increased by offsets. Very few are worth growing, except for botanical collections.

FIG. 262. SCAPE AND LEAF OF HYPOXIS ERECTA.

Hypoxis—*continued.*

H. elata (tall). *fl.* golden-yellow, 2in. in diameter; peduncles 1½in. long, slender; scapes numerous, shorter than the leaves, bearing many-flowered racemes. June. *l.* very numerous, 1ft. to 1½ft. long, spreading and revolute, thinly villous above, thickly hairy below. Natal, 1862. (B. M. 5690.)

H. erecta (erect). *fl.* yellow; scape four-flowered; peduncles twice as short as leaves. June and July. *l.* linear-lanceolate. *h.* 6in. North America, 1752. Plant hairy. See Fig. 262. (B. M. 710.)

H. latifolia (broad-leaved). *fl.* bright yellow, large, green externally; peduncles axillary; racemes spicate, many-flowered. *l.*, lower ones squamiform upwards, about 6in. long, broad-lanceolate, acuminated; upper ones narrowest, becoming gradually elongated, 2ft. long. Natal, 1854. (B. M. 4817.)

H. longifolia (long-leaved). *fl.*, perianth golden-yellow within; outer segments lanceolate, sub-acute, green and villous on the back; inner rather broader, with a dorsal green villous midrib; umbel four or five-flowered; scapes several, much shorter than the leaves. August. *l.* numerous, the outer 2ft. long, spreading on the ground; the inner sheath sub-erect; sheath broad, membranous, 2in. to 4in. long; blade grass-like, very slender, flaccid, bright green, with a few scattered hairs on the margin and keel. Stems tufted. *h.* 1½ft. Algoa Bay, 1871. (B. M. 6035.)

H. stellata (star-like).* *fl.* white, blue; scape one-flowered, shorter than the leaves. April to June. *l.* linear-lanceolate, loose-keeled. *h.* 9in. Cape of Good Hope, 1752. (B. M. 662.) The variety figured in B. M. 1223 is *elegans*.

HYSSOP (*Hyssopus officinalis*). An aromatic evergreen bushy herb, native of Southern Europe. It is cultivated for the use of its flowers and tops, which are steeped in water to make an infusion sometimes employed as an expectorant. There are three varieties, known respectively by their blue, red, and white flowers. They may be propagated by seeds, sown in April; by dividing the plants, in spring or autumn; or by cuttings, made in spring, and inserted in a shady situation. Plants raised from seeds or cuttings should, when large enough, be planted out, about 1ft. apart each way, and kept watered until established. They succeed best in a warm aspect, and in a light, rather dry soil. The plants require cutting-in occasionally, but do not need much further attention. Varieties of Hyssop are sometimes employed as edging plants.

HYSSOPUS (from *Hyssopos*, the old Greek name, used by Hippocrates). Hyssop. ORD. *Labiatæ*. A monotypic genus, the species being a hardy shrubby plant. For culture, &c., *see* **Hyssop.**

H. officinalis (officinal). *fl.* bluish-purple, rarely white; whorls six to fifteen-flowered. June to September. *l.* elliptic or linear. *h.* 1ft. to 2ft. Mediterranean region and Central Asia, 1548.

IANTHA. *See* **Ionopsis.**

IANTHE BUGULIFOLIA. *See* **Celsia bugulifolia.**

IANTHINE. Pure blue stained with red, so as to be intermediate between the two colours.

IBATIA. A synonym of **Lachnostoma** (which *see*).

IBBETSONIA. (named in honour of Mrs. Agnes Ibbetson, the author of several papers on Vegetable Physiology, published in "Nicholson's Philosophical Journal"). A small genus of shrubby greenhouse Cape plants, now referred to *Cyclopia*. For cultivation, *see* **Podalyria.**

I. genistoides (Genista-like). *fl.* yellow, pea-shaped, with an irregular purplish-brown spot at the base. Summer. *l.* sessile, ternate; leaflets narrow-linear with strongly revolute margins. *h.* 3ft. to 5ft. A much-branched glabrous shrub. (B. M. 1259).

IBERIDELLA (a diminutive of *Iberis*). ORD. *Cruciferæ*. A genus comprising six species of herbs or sub-shrubs, natives of the mountains of Syria, Persia, and Asia Minor; one being from the Himalayas. *I. rotundifolia*, the species usually seen under cultivation, is a very pretty, densely-tufted, spreading, alpine, herbaceous, tap-rooted plant, requiring a rather light soil. It may be freely increased by seeds, or by divisions.

Iberidella—*continued.*

I. rotundifolia (round-leaved).* *fl.* rosy-lilac, with a yellow eye, fragrant, about ½in. in diameter, and disposed in erect, cylindrical, crowded racemes. April. *l.* opposite, fleshy, broadly-ovate. *h.* 3in. to 6in. European Alps, 1868. (B. M. 5749.)

IBERIS (from *Iberia*, the former name of Spain). Candytuft. ORD. *Cruciferæ*. A genus comprising twenty species of annual or biennial herbs or sub-shrubs, from South Europe and Western Asia. Flowers white or purple, racemose or corymbose; petals four, two outer ones largest. Leaves alternate, linear or obovate, entire or pinnatifid. Stems round, usually smooth. All the species are of easy culture in ordinary garden soil, if the position is well exposed to sun and air. The annuals and biennials are increased by seeds. For summer flowering, sow in March or April, and in August or September for a spring display. A light sandy soil is most suitable for sowing the seeds in. The sub-shrubby sorts are handsome, compact-growing plants, admirably adapted for the fronts of shrubberies and herbaceous borders. These species may be increased by seeds, sown in spring; but the most usual method is by cuttings, or by divisions, the latter of which are easily effected.

I. amara (bitter). Common Candytuft. *fl.* white, corymbose, finally racemose. June. *l.* lanceolate, acute, somewhat toothed. *h.* 6in. to 12in. Western Europe (Britain). Annual.

I. a. hesperidifolia (Hesperis-leaved). An improved form of the type; larger, and very pretty. *h.* 1ft.

I. Bernardiana (Bernard's). *fl.* pink, corymbose. Summer. *l.* spathulate, lobed, deep glossy green, forming dense compact rosettes. *h.* 6in. Pyrenees. Annual. SYN. *I. Bubanii.*

I. Bubanii (Buban's). A synonym of *I. Bernardiana.*

I. ciliata (ciliate). *fl.* white. June and July. *l.* linear, entire, ciliated at the base. *h.* 9in. South-western Europe, 1802. Plant herbaceous, rather smooth. Biennial. (B. M. 1030.)

I. c. taurica (Taurian). *fl.* white, corymbose. May to July. *l.* ciliated, somewhat fleshy; lower ones spathulate, somewhat bidentate at the apex; upper ones linear. *h.* 6in. to 9in. Tauria, 1802. Annual or biennial.

FIG. 263. FLOWERING BRANCH AND DETACHED FLOWER OF IBERIS CORONARIA.

I. coronaria (crown-flowering).* Rocket Candytuft. *fl.* pure white, in numerous long, dense heads or spikes at the tops of the stems. July. *l.* lanceolate, coriaceous, entire. *h.* 1ft. 1836. Native country uncertain. Annual. See Fig. 263. (S. B. F. G. ser. ii. 359.) The variety known as the "Giant Snowflake" is a very fine form.

I. correæfolia (Correa-leaved).* *fl.* white, large, disposed in compact flat heads; but, as the stems become elongated, and the succession of buds open, a long round cluster is formed by the old flowers remaining, such heads or spikes being 3in. long. May and June. *l.* spathulate, obtuse, entire, smooth, about 1½in. long.

Iberis—*continued.*

Branches woody, slender, numerous, procumbent. *h.* 1ft. This garden hybrid is a valuable hardy evergreen shrub, thriving in almost any soil or situation; it has a neat and effective appearance at the angles of walks, or used as an edging. The plant may be easily increased, either by layers or by cuttings.

I. gibraltarica (Gibraltar).* *fl.* white, usually suffused with pink or red, large, in corymbose heads. Early spring. *l.* wedge-shaped, blunt, somewhat toothed at the top, rather ciliated. *h.* 1ft. to 2ft. Gibraltar, 1732. A very showy, handsome, but somewhat straggling, half-hardy evergreen species, requiring a well-drained light soil. (B. M. 124.)

I. g. hybrida (hybrid). *fl.* creamy-white, gradually deepening to a pleasing rosy-purple colour. A very desirable variety, being much more compact in habit than the type, and equally as floriferous.

I. jucunda (pleasant). A synonym of *Æthionema coridifolium.*

I. nana (dwarf). *fl.* purple. June and July. *l.* round-spathulate, entire, rather fleshy. *h.* 3in. South France and Italy, 1822. Plant herbaceous, smooth. Annual or biennial. (B. M. 2788.)

I. odorata (sweet-scented). *fl.* white, sweet-scented, racemose. Summer. *l.* linear, toothed, ciliated at the base, dilated at the top. *h.* 6in. to 12in. Greece, 1806. Annual. (S. B. F. G. 50.)

I. Pruiti (Pruit's). *fl.* pure white, in compact heads or corymbs. May or June. *l.* obovate-spathulate, entire, or somewhat toothed. Stems suffruticose at the base, smooth. *h.* 6in. Sicily. Very like *I. Tenoreana*, but having smooth, not ciliated, leaves, and pure white flowers. Perennial.

I. saxatilis (rock).* *fl.* white, corymbose. Spring and summer. *l.* linear, quite entire, somewhat fleshy, acute, ciliated. Stems ascendent. *h.* 3in. to 6in. South Europe, &c., 1739. A very common and pretty dwarf evergreen shrub.

I. semperflorens (ever-flowering).* *fl.* pure white, large, sweet-scented, corymbose. Autumn to spring. *l.* cuneated or spathulate, rather fleshy, blunt, quite entire, smooth. *h.* 1ft. to 2ft. Italy, &c., 1679. A handsome but somewhat delicate evergreen perennial.

FIG. 264. FLOWERING BRANCH OF IBERIS SEMPERVIRENS.

I. sempervirens (evergreen).* Evergreen Candytuft. *fl.* pure white, in long racemes. Spring and summer. *l.* oblong, blunt, narrowed at the base, smooth. *h.* 9in. to 12in. South Europe, 1731. This is the common branching evergreen shrubby species of Candytuft. It is adapted for nearly every style of gardening, and is one of the best perennials grown. See Fig. 264. There are several varieties, including *I. s. superba*, which has a bushy habit, and produces pure white flowers in dense heads.

I. s. Garrexiana (Garrexian).* *fl.* white, corymbose. May. *l.* oblong, narrowed at the base, blunt, quite entire, smooth. *h.* 6in. to 9in. South Europe, 1820. A variety having smaller flowers, and the racemes very much elongated in the course of flowering. Hardy evergreen. (A. F. P. iii. 40, 54.)

I. Tenoreana (Tenore's).* *fl.* purplish or whitish, umbellate. May. *l.* somewhat fleshy, crenated; lower ones obovate, narrowed at the base, and ciliated; upper ones oblong-linear. Stems ascendent, sub-shrubby at the base. *h.* 6in. South-west Europe, 1822. A very desirable perennial species. (B. M. 2783.)

Iberis—*continued.*

FIG. 265. IBERIS UMBELLATA, showing Habit and detached Inflorescence.

I. umbellata (umbelled).* Common Candytuft. *fl.* usually purple, but very variable, in terminal umbels. Spring and summer. *l.* lanceolate, acuminated; lower ones serrated; upper ones quite entire. *h.* 6in. to 12in. South Europe, 1596. A common and well-known pretty hardy annual. See Fig. 265. (B. M. 106.) The following are the most desirable varieties (the descriptions refer to the flowers): *atropurpurea*, dark crimson; *carnea*, blush or pale flesh-coloured; *nana purpurea*, deep purple, dwarf; *purpurea lilacina*, lilac-purple, dwarf.

I. violacea (violet). *fl.* purple; corymb somewhat umbellate. June and July. *l.* stalked, spathulate, blunt-toothed and entire, ciliate. *h.* 3in. 1782. Annual.

ICACINA (a name given on account of the resemblance of the branches to a tree called the Icaco). ORD. *Olacineæ.* A genus comprising three or four species of shrubs, natives of Western tropical Africa. Flowers villous, in terminal panicles. Leaves simple, alternate, exstipulate, shortly petiolate, ovate, entire, reticulate-nerved. Branches ascending or twining. *I. Mannii*, the only species yet introduced, is a shrubby stove climber, thriving in rich sandy loam and leaf mould. Propagated by cuttings, made of the young shoots, and inserted in sandy loam, in bottom heat, under a hand glass.

I. Mannii (Mann's). *fl.* ½in. long, in short, silky, axillary cymes; calyx five-lobed; petals yellow, linear-oblong; stamens exserted. October. *l.* alternate, 5in. to 7in. long, elliptic, abruptly narrowed into a long point, rounded at base, quite entire, shortly petioled, membranous, glabrous, or with midrib beneath and petiole puberulous; nerves few. Stem slender, climbing. Root a large tuber, 6in. to 12in. in diameter, terete, glabrous. Gulf of Guinea, 1865. (B. M. 6260.)

ICACINEÆ. A tribe of *Olacineæ.*

ICARANDA. A synonym of **Jacaranda** (which *see*).

ICE PLANT. *See* **Mesembryanthemum crystallinum.**

ICHNEUMON FLIES. A section of *Hymenoptera*, characterised by usually slender bodies, veined wings, with the veins inclosing several spaces or cells, and long vibratile antennæ of numerous joints (see Fig. 266). The females have an ovipositor, which, in some, is very long;

FIG. 266. ICHNEUMON FLY.

they lay their eggs in the bodies of other insects, especially in larvæ, and the larvæ of the Ichneumon feed in the body of the insect. Sometimes, only one is present; at other times, a large number feed in the same insect. Few

Ichneumon Flies—*continued.*

insects, if any, are wholly free from the attacks of Ichneumons, which are among the most active and efficient allies of the gardener, because of the number of destructive insects killed by them. Hence, Ichneumon Flies ought to be protected, as far as possible, by every horticulturist alive to his own interests.

FIG. 268. BRANCHLET OF IDESIA POLYCARPA CRISPA.

ICHNOCARPUS (from *ichnos*, a vestige, and *karpos*, a fruit; in reference to the slender follicles). SYNS. *Aganosma*, *Springia*. ORD. *Apocynaceæ*. A genus comprising nine species of tall climbing stove shrubs, natives of the East Indies, the Malayan Archipelago, Eastern Asia, and tropical Australia. For culture, *see* **Dipladenia**. According to Bentham and Hooker, the plants described under *Aganosma* should be included here.

I. frutescens (shrubby). *fl.* purple, small; corolla salver-shaped; peduncles axillary, very long, racemose. July and August. *l.* opposite, oblong-lanceolate, glabrous. Tropical Asia and Australia, 1759.

ICICA. This genus is now included under *Bursera*.

ICONES. Pictorial representations of plants.

ICOS. This, in Greek compounds, signifies twenty.

FIG. 267. BRANCH OF IDESIA POLYCARPA.

IDESIA (named after Yobrants Ides, a Dutch traveller in China). ORD. *Bixineæ*. A monotypic genus, the species being a large and ornamental hardy tree. It thrives in light and well-drained sandy soil. Increased in spring or autumn, by half-ripened cuttings, inserted in sandy loam, and placed under a bell glass, in gentle heat; also by seeds, sown in spring, likewise in a gentle heat.

I. polycarpa (many-fruited).* *fl.* diœcious and apetalous, inconspicuous, in terminal panicles. *fr.* in drooping clusters, orange-coloured, about the size of a pea. *l.* large, alternate, cordate, remotely serrulate, acuminate. Japan. SYNS. *Flacourtia japonica*, *Polycarpa Maximowiczii*. See Fig. 267. (R. H. 1868, 320.)

I. p. crispa (curled). This is a sport from the type, and is remarkable for its curiously cut and crisped leaves. See Fig. 268.

IDOTHEA. *See* **Drimia.**

IDOTHEARIA. *See* **Drimia.**

IGNATIA. Now included under **Strychnos** (which *see*).

IGNEUS. Fiery-red.

ILEX (from *Ilex*, the Latin name given by Virgil to *Quercus Ilex*). Holly. Including *Prinos*. ORD. *Ilicineæ*. A genus comprising 145 species of mostly hardy shrubs or trees, inhabiting temperate and tropical regions, abundant in South America, rare in Africa and Australia. Flowers white, often sub-diœcious; peduncles axillary, few-flowered, or often ramose. Drupe globose. Leaves alternate, often shining, entire, dentate or spinose. The common Holly, with its innumerable varieties, is well known and extensively cultivated. It submits to training in almost any shape, and soon recovers if severely pruned to preserve the desired character in this respect. Pruning or cutting should be practised either in September or April, both in the case of trained trees and the clipping of hedges. The Holly may be best transplanted at the beginning of May, or early in autumn, when there is sufficient time for new roots to be formed before winter. It does not transplant well when old, but is a long-lived tree when established in good soil and left undisturbed at the root. One of the handsomest and most endurable hedges which can be grown is made from this plant. It is slow-growing, taking eight or ten years from seed to make a fence 4ft. high; consequently, it is less extensively employed than

Ilex—*continued.*

it would otherwise be. It is not unusual to allow a long stem to run up, and form a tree at intervals along a Holly hedge. The red berries, contrasting with the dark green foliage throughout the winter, have a very pleasing appearance, and the branches are in great request for Christmas decorations. Propagation is usually effected by seeds, which require treatment similar to those of the Hawthorn, being collected when ripe in the autumn, and buried in sand until the following spring or autumn, when they may be sown in drills or beds and covered with 1in. of soil. A few boughs, placed over the beds, will be very serviceable as a protection against frosts or the heat of the sun, which latter is injurious to the young Hollies. The plants may remain in the seed-beds for two years, and can then be transferred into nursery rows 1ft. apart. After being transplanted, they must stand for two years at least, when they will require to be again removed, to give them more space. The plants will then be about 1¼ft. or 1½ft. high. The varieties can only be propagated by grafting, during March; and by budding, in May, with a pushing bud, or in August with a dormant one. Stocks for both purposes may be of the common sort, raised from seed. There are a number of varieties of far more horticultural value than the species. The variegated forms are particularly attractive.

FIG. 269. ILEX AQUIFOLIUM.

I. Aquifolium (prickly-leaved).* Common Holly. *fl.* sub-umbellate; peduncles axillary, short, and many-flowered. May and June. Berries red, roundish. *l.* ovate or oblong-acute, shining, waved, spiny-toothed. *h.* 10ft. to 40ft. Europe (Britain) and West Asia. See Fig. 269. From the bark of this, as well as some other species, birdlime is obtained.

I. Cassine (Cassine). *fl.* in clusters, nearly sessile, smooth. May. *l.* alternate, evergreen, lance-ovate or elliptical, crenate. South United States, 1726. Shrub. The leaves are used for tea by the people along the coast, as they formerly were to make the celebrated "Black Drink" of the North Carolina Indians.

I. chinensis (Chinese). *fl.*, corymbs pedunculate, dichotomous. July. *l.* ovate-oblong; edge with little, cartilaginous, scarcely pungent teeth. *h.* 10ft. China, 1814. (B. M. 2043.)

I. cornuta (horned).* Berries large. *l.* hard, dark green, almost always furnished with three strong spines at the end, which, in mature plants, assume the appearance of horns; when young, one or two more spines are added at each side, but these disappear in old plants. North China, 1850. A fine hardy Holly. See Fig. 270. (G. C. 1850, p. 311.)

I. crenata (crenated).* *fl.*, peduncles drooping, scattered on the branches, usually three-flowered. Spring. *l.* ovate, crenate, blunt, with revolute edges. Japan. Of this compact growing, small-leaved species, there are several forms; *Fortunei* has rounder leaves, and is a stronger grower than the type; *variegata* has leaves blotched with dull yellow. See Fig. 271.

I. Dahoon (Dahoon). *fl.*, peduncles lateral and terminal, in panicled corymbs. May and June. Berries red. *l.* lanceolate-elliptical, coriaceous, almost quite entire, with the edges a little revolute, and with the midrib, petioles, and branchlets villous. *h.* 8ft. North America, 1726. (W. D. B. ii. 114.)

Ilex—*continued.*

FIG. 270. ILEX CORNUTA, showing Habit, detached Flowering Branch, and Flower.

I. D. myrtifolia (Myrtle-leaved). *fl.*, peduncles slender, three to nine-flowered, or the more fertile shorter and one-flowered, smooth. May. *l.* linear-lanceolate or linear-oblong, sparingly and sharply serrate or entire. *h.* 6ft. South United States, 1806. Shrub.

FIG. 271. BRANCHLET OF ILEX CRENATA VARIEGATA.

I. decidua (deciduous). *fl.*, peduncles of the sterile flowers longer than the petioles, of the fertile ones short; calyx teeth smooth, acute. May. *l.* wedge-oblong or lance-obovate, obtusely serrate, downy on the midrib beneath, shining above. United States. Shrub. (W. D. B. ii. 115.)

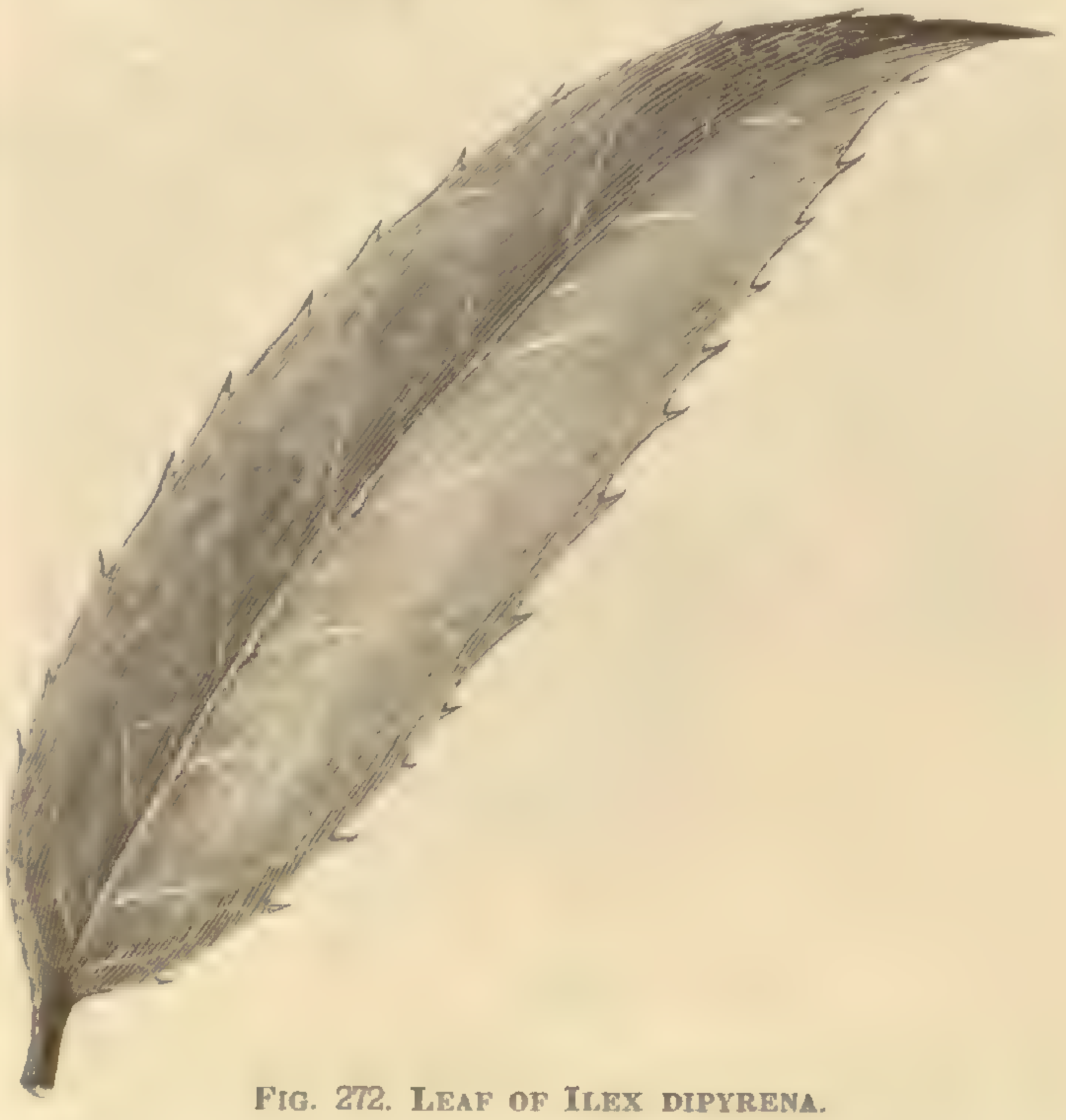


FIG. 272. LEAF OF ILEX DIPYRENA.

Ilex—*continued.*

I. dipyrena (two-seeded).* *fl.* small, sessile, disposed in axillary fascicles. April and May. Berries dark brown, two-seeded. *l.* elliptical-oblong, mucronate, on short stalks, even, hardly wavy, remotely spiny-serrated. Branchlets angular. *h.* 12ft. North India, 1840. See Fig. 272. (B. F. F. 15.)

I. glabra (smooth). Inkberry. *fl.*, peduncles of the sterile flowers three to six-flowered, of the fertile ones one-flowered; calyx teeth rather blunt. June. *l.* wedge-lanceolate or oblong, sparingly toothed towards the apex, smooth. *h.* 2ft. to 3ft. North America, 1759. Shrub. SYN. *Prinos glaber.* (L. B. C. 450.)

I. Gongonha (Gongonha). *fl.* pentandrous, with entire stigma. *l.* elliptic, mucronate, spiny-toothed, rounded at base. *h.* 30ft. Brazil. This species is employed as tea in its native country.

I. lævigata (smooth). *fl.* six-cleft. June. *l.* lanceolate or oblong-lanceolate, pointed at both ends, appressed-serrulate, shining above, mostly glabrous beneath. *h.* 4ft. North America Shrub. SYN. *Prinos lævigatus.* (W. D. B. i. 28.)

I. latifolia (broad-leaved).* *fl.*, pedicels aggregate, longer than the petiole, and rising above the axils of the leaves. *l.* ovate, bluntish, serrated, shining above, with revolute edges. *h.* 20ft. Japan, 1840. (B. M. 5597.)

I. mollis (soft). *fl.*, sterile ones very numerous, in umbel-like clusters, the pedicels shorter than the petiole, and (with the calyx) soft-downy; the fertile peduncles very short. *l.* soft, downy beneath, oval, ovate, or oblong, taper-pointed at both ends, especially at the apex, thin-membranaceous, sharply serrulate. North America. Shrub. SYN. *Prinos dubius.*

I. monticola (mountain). *fl.*, fertile ones very short-peduncled; calyx ciliate. May. *l.* ovate or lance-oblong, ample, taper-pointed, thin-membranaceous, smooth, sharply serrate. North America. Shrub.

I. opaca (shady).* American Holly. *fl.* in loose clusters along the base of the young branches and in the axils; calyx teeth acute. May and June. *l.* oval, flat; the wavy margins furnished with scattered spiny teeth. *h.* 20ft. to 40ft. United States, 1744. (W. D. B. i. 3.)

I. paraguariensis (Paraguay). Brazilian Tea; Caa-Cuys; Caa-Mini; Caa-Quazu; Paraguay Tea. *fl.*, peduncles axillary; many-parted. *l.* obovate, oblong, bluntish, remotely serrated. *h.* 15ft. Paraguay, 1823. A greenhouse evergreen tree. The dried leaves of this species furnish the Yerba de Maté, or Paraguay Tea, of which enormous quantities are consumed in South America. (B. M. 3992.)

I. platyphylla (broad-leaved). *fl.*, corolla lobes concave, obovate; stamens shorter than the lobes; pedicels with two small bracts below the middle, thickened upwards; cyme many-flowered, longer than the thickened petioles. May. *l.* extremely variable in size and shape, generally broadly ovate, approaching orbicular, thick, coriaceous, quite entire. *h.* 20ft. Canary Islands, 1844. A hardy evergreen, pyramidal tree. (B. M. 4079.)

I. verticillata (whorled). Black Alder; Winterberry. *fl.* all very shortly peduncled. May and June. *l.* obovate, oval, or wedge-lanceolate, pointed, acute at the base, serrate, downy on the veins beneath. *h.* 6ft. North America, 1736. Shrub. SYN. *Prinos verticillatus.* (W. D. B. i. 30.)

VARIETIES. The varieties of *I. Aquifolium* are extremely varied in character, marking, and form. Those enumerated below are the most serviceable and generally grown. For most of the descriptions, we are indebted to Mr. T. Moore's synopsis, which appeared in the "Gardeners' Chronicle." The list is here divided into two sections.

I. Green-leaved Varieties.

I. A. balearica (Balearic).* *fl.*, umbels axillary, few-flowered, short. May to July. *l.* ovate, acute, shining, flat, entire or spiny-toothed. *h.* 10ft. Minorca, 1815.

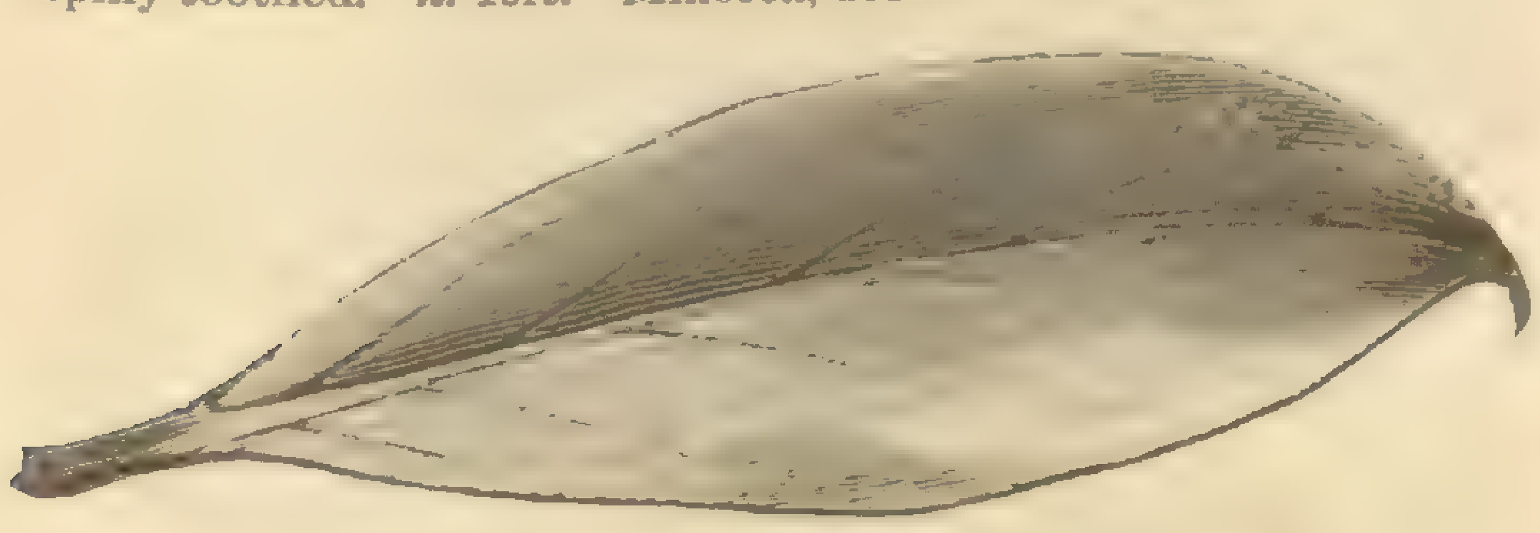


FIG. 273. LEAF OF ILEX AQUIFOLIUM BESSONI.

I. A. Bessoni (Besson's). *l.* obovate-lanceolate, quite spineless, less rigid in texture and lighter green in colour than most other varieties. See Fig. 273.

I. A. costata (ribbed). Grecian Holly. *l.* oblong-acute, 2½in. long, 1¼in. broad, furnished with slightly divaricate somewhat distant spines. Distinct and free-growing.

Ilex—*continued.*

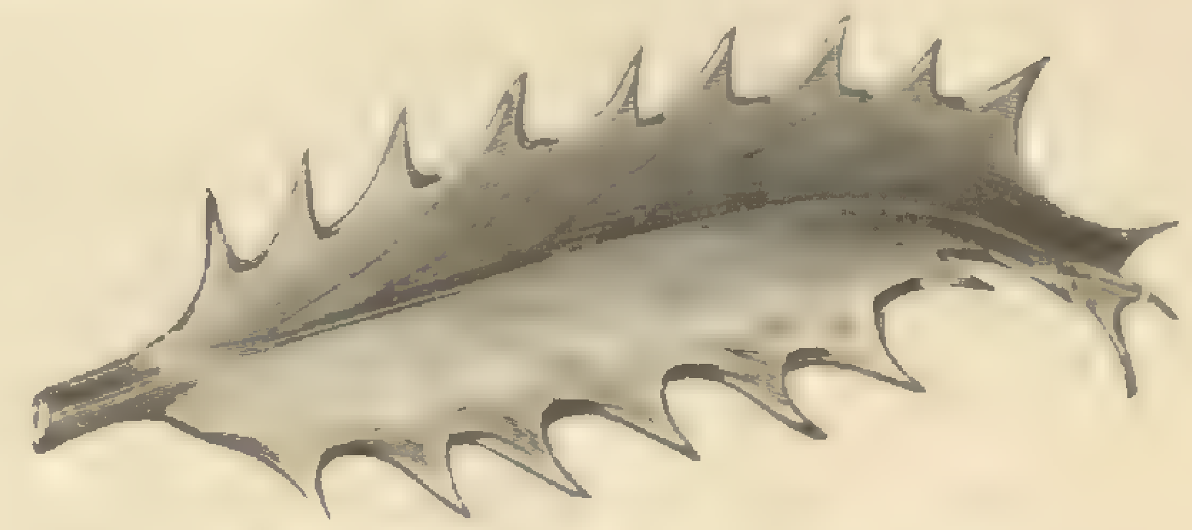


FIG. 274. LEAF OF ILEX AQUIFOLIUM CRASSIFOLIA.

I. A. crassifolia (thick-leaved). *l.* dull green, very thick, with recurved tips and margins, furnished with prominent saw-like teeth. A slow-growing, dwarf, bushy variety, with purple bark. See Fig. 274.

FIG. 275. LEAF OF ILEX AQUIFOLIUM DONINGTONENSIS.

I. A. Doningtonensis (Donington's). *l.* lanceolate, sometimes turned to one side, so as to become sickle-shaped, about 2in. long and ¾in. broad; margin having a few, or sometimes no spines. A distinct variety, of free pyramidal growth. See Fig. 275. (G. C. n. s., ii. 687.)

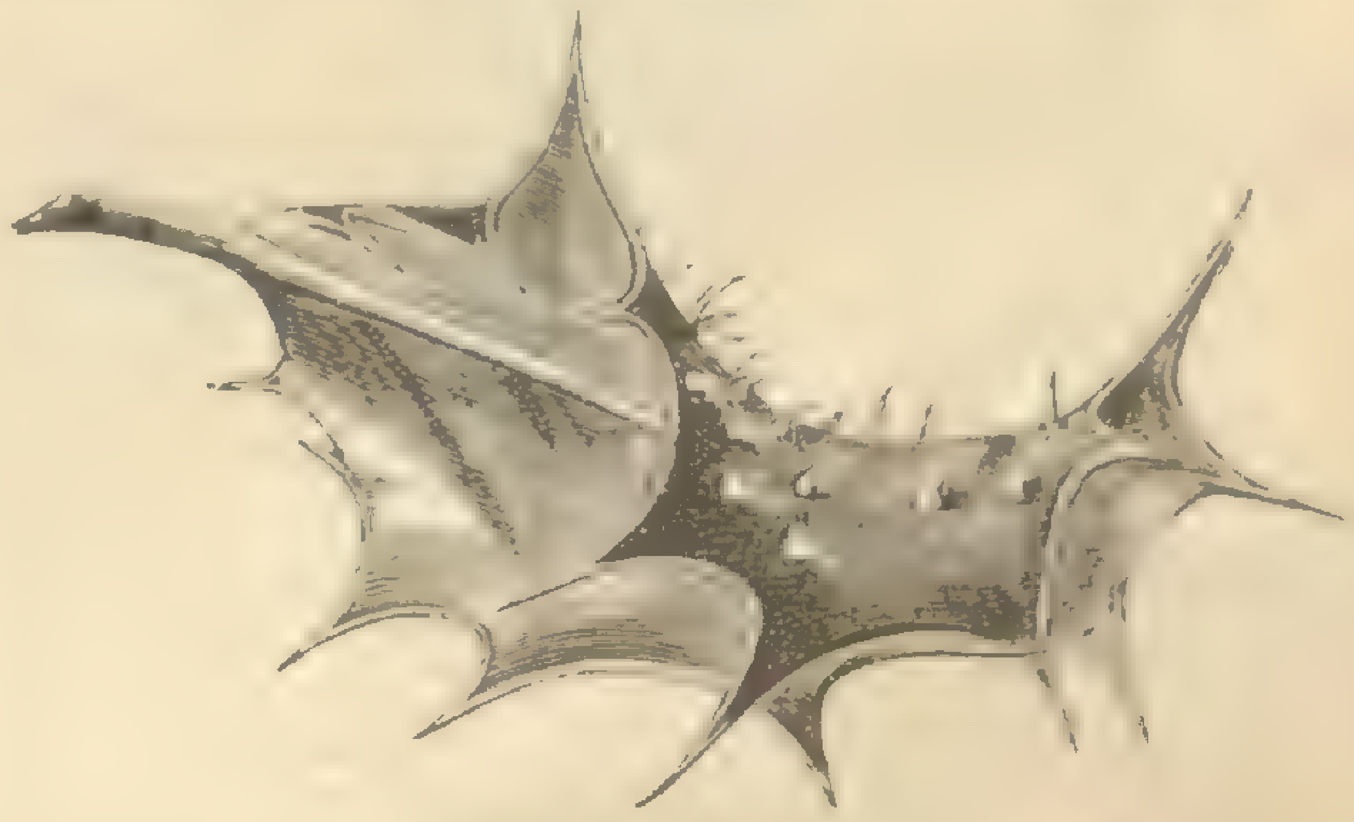


FIG. 276. LEAF OF ILEX AQUIFOLIUM FEROX.

I. A. ferox (fierce). Hedgehog Holly. *l.* ovate-oblong or narrowly-ovate, 2in. or more long, much acuminate, with strongly-developed divaricate marginal spines. The convex spiny surface of the dark green leaves is its chief characteristic. Bark purple. See Fig. 276.

I. A. Foxii (Fox's). *l.* ovate, stoutish, 2in. to 2½in. long, with rather distant, regular, plane, freely-developed spines. A small-growing form. (G. C. n. s., ii. 751.)

FIG. 277. LEAF OF ILEX AQUIFOLIUM HENDERSONI.

I. A. hastata (halbert-shaped).* *l.* from ¾in. to 1¼in. long, about ½in. broad; spines large, very prominent, consisting usually of one or two pairs on each side at the base, but occasionally more, the

Ilex —*continued.*

upper half of the leaf forming a large, entire, oblong, bluntish lobe. A remarkable form, sometimes known as *latispina minor*, *l. nana*, and *l. pygmæa*. (G. C. n. s., ii. 687.)

I. A. Hendersoni (Henderson's). *l.* about 2¾in. long by 1⅝in. broad, oblong-elliptic, opaque, dark green with sunken veins, margin generally entire. Bark purplish. See Fig. 277.

I. A. heterophylla (variable-leaved). *l.* ovate or elliptic-ovate, about 2½in. long, 1in. to 1½in. wide, twisted near the point, entire or distinctly spinose. A strong-growing form. (G. C. n. s., ii. 519.)

I. A. Hodginsii (Hodgins'). *l.* very broadly ovate, 3in. to 4in. long, 2½in. broad, with distant and rather unequally-disposed but strong spines. A handsome form.

I. A. maderensis (Madeira). *l.* ovate or ovate-oblong, with a short acuminate point, 3in. long, about 1¾in. wide; margin with tolerably regular spines lying in the plane of the leaf. Less hardy than many others.

I. A. monstrosa (monstrous). *l.* oblong, much acuminated, with numerous strongly-developed marginal spines, which are mostly directed upwards. (G. C. n. s., ii. 751.)

I. A. myrtifolia (Myrtle-leaved).* *l.* ovate-lanceolate, 1in. to 1½in. long, ½in. to ⅝in. broad, usually moderately spiny at the margin, but sometimes quite entire. Known also as *angustifolia*. (G. C. n. s., ii. 687.)

I. A. nobilis (noble). *l.* roundish-ovate, 2¾in. to 3¾in. long, with somewhat distant, bold, marginal spines. A vigorous-growing form. (G. C. n. s., ii. 432.)

FIG. 278. LEAF OF ILEX AQUIFOLIUM OVATA.

I. A. ovata (ovate-leaved). *l.* ovate, 2½in. long, with regular angular, scarcely spiny teeth. A slow-growing but distinct form. See Fig. 278. (G. C. n. s., ii. 751.)

I. A. platyphylla (broad-leaved).* *l.* broadly-ovate, 3½in. long, 2¼in. broad; spines variable in disposition, sometimes evenly disposed around the edge.

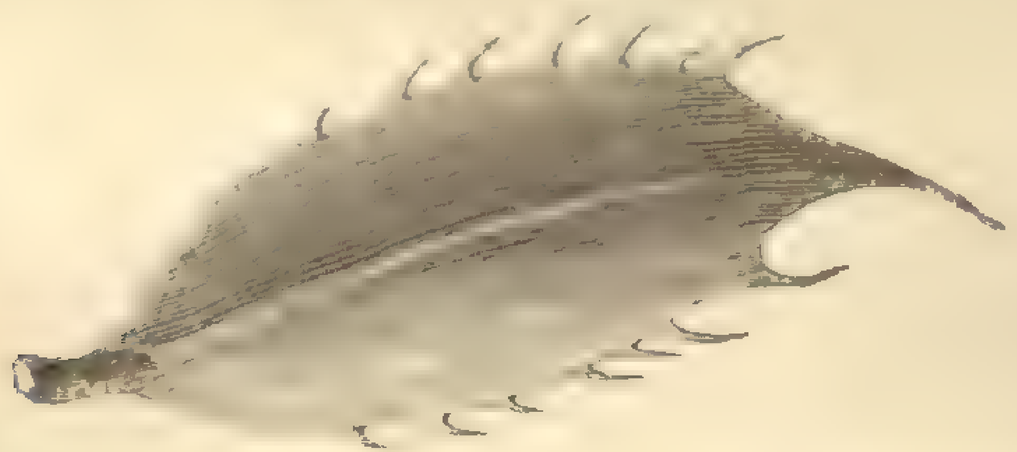


FIG 279. LEAF OF ILEX AQUIFOLIUM PYRAMIDALIS.

I. A. pyramidalis (pyramidal). *l.* ovate, acuminate, dark green, with six or eight spines on the same plane as the leaf. A distinct variety, of more erect, pyramidal habit than most others. See Fig. 279.

I. A. recurva (recurved). *l.* ovate-acuminate, about 1¼in. long, ½in. broad; margin spiny throughout, usually terminating in an elongated spine. A dwarfish form, sometimes known as *tortuosa*. (G. C. n. s., ii. 687.)

FIG. 280. LEAF OF ILEX AQUIFOLIUM TORTUOSA.

Ilex—*continued.*

I. A. serratifolia (saw-edge-leaved). *l.* lanceolate, about 1½in. long and ½in. broad, stiff; midrib convexly curved; spines numerous, regular, stoutish. Resembling *myrtifolia*. (G. C. n. s., ii. 687.)

I. A. tortuosa (twisted). *l.* nearly 2in. long, about 1in. broad, the blade being once spirally twisted, the edge being, in addition, more or less revolute or marginate, rarely spiny. A vigorous grower, of dense habit. Commonly known as the Screw Holly. See Fig. 280.

I. A. Whittingtonensis (Whittington's).* *l.* lanceolate, or elliptic-ovate, about 2½in. long, ⅝in. wide, sometimes slightly recurved; spines numerous, stiff. An elegant and distinct form. (G. C. n. s., ii. 687.)

II. Silver and Gold-leaved Varieties.

I. A. albo-picta (white-blotched). A synonym of *I. A. argentea medio-picta.*

I. A. argentea elegantissima (very elegant silver-striped). *l.* elliptic or elliptic-ovate, about 2½in. long, with unequal spines, which are generally few and distant; central part dark green, with grey blotches; margin creamy-white. Known also as *elegantissima.*

I. A. argentea marginata (silver-margined).* *l.* broadly-ovate, 2in. to 2½in. long, usually spiny, dark green, with the disk slightly mottled, and with an irregular narrowish silvery margin. There are several garden names for this old variety, including *albo marginata*, *argentea lato marginata*, and *variegata argentea.*

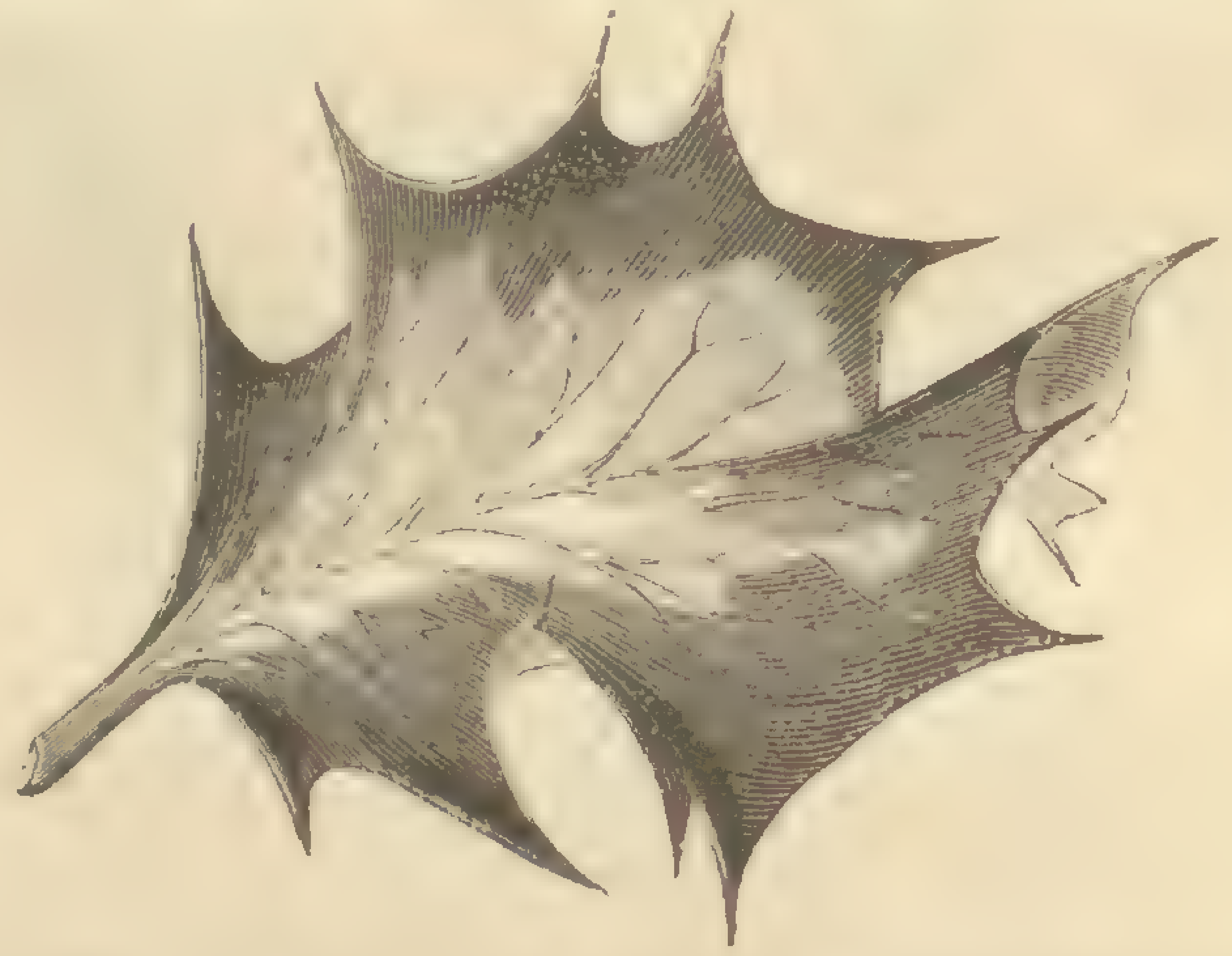


FIG. 281. LEAF OF ILEX AQUIFOLIUM ARGENTEA MEDIO-PICTA.

I. A. argentea medio-picta (white blotched). *l.* ovate or cuneately-ovate, 1½in. to 2in. long, about 1in. broad, with strong and much divaricated spines. Colour dark green at edge, with large central blotch of creamy-white. Bark green. SYNS. *I. A. albo-picta*, I. Silver Milkmaid. See Fig. 281.

I. A. argentea stricta (upright silvery). *l.* oblong-elliptic, 2in. to 2½in. long, 1½in. broad; spines somewhat wavy; disk conspicuously mottled with flakes of green and greyish-green; edge broadly and unequally margined with creamy-white.

I. A. aurea angustifolia (narrow-leaved golden).* *l.* elliptic-oblong, acuminate, 1½in. to 2½in. long, nearly 1in. broad, with a spiny and rather wavy edge; centre pale green; margin deep golden. (G. C. n. s., v. 44.)

I. A. aurea latifolia (broad-leaved golden).* *l.* ovate, 2in. to 2½in. long, strongly divaricate, and with well-developed spines; disk splashed with pale green, and there is a narrow but irregular deep-golden edge.

I. A. aurea maculata (gold-spotted). *l.* oblong-ovate, about 2½in. long, with distant triangular spines; disk with a large blotch of creamy-yellow, surrounded by a green border. A distinct variety, sometimes known as *maculata aurea.*

I. A. aurea marginata bromeliæfolia (gold-margined Bromelia-leaved). *l.* ovate, with flattish distant marginal spines, and a flat acutely-lengthened point; disk mottled with pale green on a dark green ground; margin with an unequal but well-defined band of yellow. Known also as *bromeliæfolia aureo-marginata.*

I. A. aurea marginata fructu-luteo (gold-margined, yellow-berried). Berries yellow. *l.* ovate, 2½in. long, coarsely and rather distantly spined; disk green, blotched with grey; edge greenish-yellow.

I. A. aurea picta latifolia (gold-painted, broad-leaved).* Golden Milkmaid. *l.* ovate or broadly-ovate, 2in. or more in length, and sometimes 1½in. broad; spines variable in number and position; disk irregularly marked by a large branching deep yellow blotch, with an irregular, often narrow, deep glossy green margin. A very handsome and distinct form. (G. C. n. s., v. 365.)

I. A. aurea regina.* Golden Queen. *l.* broadly-ovate, 2½in. to 3in. long, 1½in. to 2in. broad, with very strong spreading and variously-directed spines; disk usually much mottled with grey

Ilex—*continued.*

and green, with a broad, well-defined, continuous margin of deep golden-yellow. A very handsome form, and said to be the finest of the gold-edged series. It is also known as *aurea marginata, latifolia marginata,* and *reginæ.* (G. C. n. s., v. 44.)

I. A. Cookii (Cook's). *l.* ovate, flat, with rather weak spines; very dark green, with a narrow edge of greenish-yellow, and some central blotches. (G. C. n. s., v. 437.)

I. A. ferox argentea (fierce, silvery).* Silver-striped Hedgehog. *l.* ovate, more or less convex, deep green, bristling with stiff echinate spines towards the front and edges; margin and surface spines creamy-white. Known also as *ferox argentea variegata.* (G. C. n. s., v. 44.)

I. A. Handsworthensis (Handsworth).* *l.* elliptic-oblong, 2½in. to 3in. long, margined with very strong prominent white spines; disk mottled with green and greyish-green, and with a distinct and tolerably even margin of creamy-white. A handsome, free-growing form.

I. A. heterophylla aureo-picta (various-leaved, gold-painted). *l.* ovate, flat, toothless, 2½in. long; edge dark green; middle conspicuously marked with a broad, unequally-developed, feathery blotch of bright yellow. (G. C. n. s., vi. 389.)

I. A. Hodginsii aurea (Hodgins' golden).* *l.* broadly oblong-ovate; disk conspicuously mottled with dark and grey-green; margin broad, golden.

I. A. Lawsoniana (Lawson's).* *l.* ovate or bluntly elliptical, 2½in. to 3¼in. long, opaque green; central or discal portions marked with broad bands or blotches of yellow; spines distant. Very handsome. The same as *Lawsoniana variegata.* (G. C. n. s., v. 624.)

I. A. Madame Briot. *l.* large, 2½in. to 3in. long, 1¼in. to 1½in. broad, oblong-ovate, furnished at the edge with strongly-developed wavy or divaricate spines; surface considerably mottled with yellow and green on the disk, and having a narrow golden edge. Of Continental origin.

I. A. maderensis variegata (variegated Madeiran). *l.* ovate or obovate, 2in. to 2½in. long, distantly plane-spined, or occasionally somewhat wavy; dark green at the margin, with a feathered golden blotch, mixed with pale green in the centre.

I. A. scotica aurea (Scotch golden). *l.* obovate, marginate, about 1½in. long, nearly entire, but loosely wavy, narrowing to wedge-shaped at the base; disk dark mottled green, with a broad golden edge.

I. A. Wateriana (Waterer's).* *l.* oblong, ovate, or obovate, often oblique, 1¾in. to 2½in. long, with or without spines; disk dark green, mottled, often in sectional streaks, with yellowish-green and greyish-green, and with a broad but irregular marginal band of deep golden-yellow, which is not continuous, sometimes wholly golden, at others half golden. A beautiful dense dwarf shrub. It is known also as *compacta aurea* and *nana aurea.* (G. C. n. s., vi. 233.)

ILICINEÆ. A small natural order of trees or shrubs, of which the common Holly, *Ilex Aquifolium,* is the type. Flowers white, often small; inflorescence axillary and terminal, cymose. Leaves alternate; stipules minute or absent, petiolate, simple, generally coriaceous, often entire. The species inhabit temperate and tropical regions, but are absent from North-west America. They contain a bitter principle, the Ilicine of chemists, combined in various proportions with an aromatic resin and a glutinous matter, to which some species of Holly owe medicinal properties. There are about 150 species, and the following genera: *Byronia, Ilex,* and *Nemopanthes.* The order is sometimes known as *Aquifoliaceæ.*

ILLAIREA. This genus is now included under **Loasa** (which *see*).

ILLECEBRACEÆ. An order of sub-erect, diffuse, or pulvinately-tufted, annual or perennial herbs (rarely shrubs or sub-shrubs). The species are widely distributed, principally throughout warm and dry regions, many being found in South Europe and North Africa. Flowers green or white, regular, generally hermaphrodite, inconspicuous, herbaceous, often scariously bracted, generally disposed in trichotomous cymes; petals small or absent. Fruit small, indehiscent, or three-valved. Leaves generally opposite, small, entire; base often connate; stipules scariose, simple, bifid or connate, rarely none. The order comprises seventeen genera and about ninety species. Illustrative genera are: *Illecebrum, Paronychia,* and *Scleranthus.*

ILLECEBRUM (from *illecebra,* an old Latin word, meaning enticement or attraction, applied by Pliny to the

Illecebrum—*continued.*

Stonecrop). ORD. *Illecebraceæ.* A genus now reduced to a single species, but which formerly included several South European ones now forming the genus *Paronychia. I. verticillatum* is a small, hardy, glabrous, much-branched annual, thriving best in a moist peat soil. Propagated by seeds.

FIG. 282. FLOWERING SHOOT OF ILLECEBRUM VERTICILLATUM.

I. verticillatum (whorled). *fl.* shining-white, in whorls, in the axils of the leaves. Summer. *l.* opposite, obovate, green. *h.* 1in. to 3in. North Africa and West Europe (Britain, only in Devon and Cornwall). See Fig. 282.

ILLICIUM (from *illicio,* to entice or allure; on account of the agreeable aromatic smell of the species). Aniseed-tree. ORD. *Magnoliaceæ.* A genus comprising five species of half-hardy evergreen shrubs. Flowers very beautiful and fragrant, singly or in threes from the sides of the branches; petals nine to thirty, disposed in several series. Carpels stellately-disposed, capsular, opening on the upper side. Leaves oblong, stalked, coriaceous, exhaling a strong odour of Aniseed. The species thrive in a compost of sandy loam and peat, and need greenhouse protection during winter, except in the southern counties. Propagated, during summer, by cuttings of young ripened shoots, inserted in sandy soil, under a hand glass.

I. anisatum (Anise-scented).* *fl.* yellowish-white, small, disposed in terminal clusters. Summer. *l.* entire, smooth. *h.* 4ft. China and Japan. This tree is held sacred by the Japanese, who form wreaths of it with which to decorate the tombs of their deceased friends; they also burn the bark as incense before their deities. The leaves are reported to possess poisonous properties. SYN. *I. religiosum.* (B. M. [illegible].)

I. floridanum (Floridan).* *fl.* of a fine deep red, having the appearance of being double; petals twenty to thirty; peduncles hanging down, but becoming erect as the petals drop. April to July. *l.* oblong-lanceolate, acuminate. *h.* [illegible] Florida, 1771. (B. M. 439.)

I. parviflorum (small-flowered). *fl.* scentless; petals yellowish, six to twelve, ovate-roundish; sepals three, ovate, somewhat ciliated. May and June. *l.* lanceolate, acute, scented. *h.* 3ft. Southern United States, 1790.

I. religiosum (holy). Synonymous with *I. anisatum.*

IMANTOPHYLLUM (from *imas, imantos,* a leather thong, and *phyllon,* a leaf; alluding to the shape and substance of the foliage). ORD. *Amaryllideæ.* This genus is now included under *Clivia*; but, as the plants

Imantophyllum—*continued.*

described below are so well known in gardens under the name here given, the genus *Imantophyllum* is retained. The species are exceedingly ornamental plants for greenhouse decoration in spring and summer. They may be propagated from seed; but, as the production of seed has such a weakening effect on the plants ripening it, this method is not generally practised. The usual mode is to propagate by divisions or offsets, secured when repotting the old plants. Unless very small, they should be inserted at first in 5in. pots, so that they can remain for a year without further disturbance. The roots are large and fleshy, and become so thickly matted together in established plants that it is difficult to separate them. Imantophyllums succeed best in soil composed chiefly of fibry loam, with some leaf mould and charcoal added. A little crushed bone or bone dust is sometimes inter-

Imantophyllum—*continued.*

I. Gardeni (Garden's).* *fl.* reddish-orange or yellow; perianth 2in. to 3in. long, curved downwards; scape as long as the leaves, with an umbel of ten to fourteen flowers. Winter. *l.* narrow, 1ft. to 2ft. long, distichous, arching, deep green. Natal and Transvaal, 1862. (B. M. 4895, under name of *Clivia Gardenii.*)

I. miniatum (brick-coloured).* *fl.* fine deep orange, lower part deep buff, anthers and style bright yellow; perianth about 2in. long, somewhat vase-shaped; umbel large, ten to twenty-flowered. Spring and summer. *l.* ligulate, acute, distichous, 1ft. to 2ft. long, broadly sheathed at the base, deep green. *h.* 1ft. to 2ft. Natal, 1854. See Fig. 284. (B. M. 4783.) *I. m. splendens* is a fine form, with much brighter and deeper coloured flowers than the type. There are several hybrids, which are very attractive.

IMBERBIS. Without hairs.

IMBRICATE. Overlapping each other.

IMHOFIA. Included under **Hessea** (which *see*).

IMMARGINATE. Having no rim or edge.

FIG. 283. IMANTOPHYLLUM CYRTANTHIFLORUM, showing Habit and detached Flower.

mixed, with good results, as the plants seldom need repotting when once established. They may be grown to flower in pots ranging from 5in. to 10in. in diameter, according to the strength of the different plants. Syringing and any amount of water may be applied in summer, when new growth is being made; and a temperature of 50deg. to 60deg., with air in spring and summer, will be sufficient. In winter, less water should be given, and a season of rest allowed, by keeping the plants quite cool. Good drainage must be insured when potting; and an annual top-dressing of rich soil, applied to old plants, in spring, will be preferable to disturbing their roots. Imantophyllums keep in flower a long time in a cool greenhouse.

I. Aitoni (Aiton's). A synonym of *Clivia nobilis.*

I. cyrtanthiflorum (Cyrtanthus-flowered). *fl.* clear rich salmon or light flame-coloured, large, with a light centre; perianth cup-shaped, pendulous; corymbs broad. Winter and spring. *l.* dark green. A supposed hybrid between *A. miniatum* and *Clivia nobilis.* See Fig. 283. (F. d. S. 1877.)

IMMORTAL FLOWER, or **IMMORTELLE.** A name applied to various species of *Antennaria, Gnaphalium, Helichrysum,* &c.

FIG. 285. IMPARI-PINNATE LEAF.

IMPARI-PINNATE. A term applied to a pinnate leaf having a terminal or odd leaflet. An Impari-pinnate leaf is shown at Fig. 285.

IMPATIENS (from *impatiens*, impatient; referring to the elasticity of the valves of the seed-pod, which

Impatiens—*continued.*

discharge the seeds when ripe). Balsam. SYN. *Balsamina.* ORD. *Geraniaceæ.* A genus comprising about 135 species of greenhouse or hardy, annual or biennial herbs, sometimes suffrutescent, natives, for the most part, of the mountains of tropical Asia and Africa, rare in Europe, North America, North Asia, and South Africa. Flowers purple, yellow, pink, or white, often showy; peduncles axillary; petals four, cruciate; two outer ones alternating with the sepals, upper one arched and emarginate, lower one drawn out into a spur at the base; branches many-flowered. Leaves alternate, very rarely opposite. Comparatively few of the species are now in cultivation. The hardy annual kinds may be readily raised from seed, in spring, and they succeed in any ordinary light soil. The stove and greenhouse species may be propagated from cuttings; or from seeds, when these are to be obtained. Cuttings generally root freely in a close frame. *I. Sultani* is one of the most beautiful and easily grown plants in cultivation. It succeeds well in a greenhouse throughout the summer, but requires an intermediate or warm structure in winter. If cuttings are taken from strong, healthy shoots, they root quickly in a propagating frame, at almost any season. They are best inserted singly in small pots, and afterwards kept somewhat restricted at the root, by only allowing very moderate shifts. Useful decorative plants may be grown in 5in. or 6in. pots, and they usually succeed better in these than in larger sizes. A rich, open soil should be used. This species is comparatively new, and has been recommended for summer bedding outside; but it has hitherto been tried without much success. *I. flaccida alba* is very useful; it succeeds under the same treatment as *I. Sultani*. *I. Jerdoniæ* is a dwarf species, and requires special treatment. It should be placed in a basket, about April, in a compost of peat and loam, and be suspended

Impatiens—*continued.*

in a moist stove until beginning to flower, when a cooler and drier position will be more suitable. Towards November, the leaves will drop, and the stems become swollen, thus indicating their ripening off. The plants should then be removed, and suspended near the glass in a house where there is a temperature of about 55deg., and a rather dry atmosphere maintained. Here they should be allowed to remain quite dormant, until starting time in April, the following year.

I. amphorata (pitcher-like).* *fl.* pale purple, suffused and speckled with rose-red, 1½in. long; sepals greenish, broadly orbicular-cordate, acute; standard orbicular, notched at top, spurred behind; lip cylindri-saccate, tip rounded with a short red incurved spur ⅔in. long; lateral lobe rounded, terminal, pendulous, obtuse; racemes 2in. to 5in. long, many-flowered August and September. *l.* bright green, often with pink edges and midrib, 3in. to 6in. long, petioled, elliptic-ovate or lanceolate, acuminate, finely crenate-serrate. Stem succulent, branched upwards. *h.* 3ft. to 6ft. Western Himalayas. A handsome hardy annual. (B. M. 6550.)

I. Balsamina (Balsam).* Common Balsam. *fl.* red; pedicels aggregate. Summer. *l.* lanceolate, serrated; lower ones opposite. *h.* 1ft. to 2ft. Tropical Asia, 1596. A well-known annual. SYN. *Balsamina hortensis.* See Fig. 286. For general cultivation, *see* **Balsam.**

I. B. coccinea (scarlet). *fl.* red; spur incurved, as long as the flower. June to September. *l.* alternate, oblong-oval, serrated; leafstalks with many glands. *h.* 2ft. East Indies, 1808. Stove annual. (B. M. 1256.)

I. bicolor (two-coloured). *fl.*, lateral sepals green, small; vexillum white, green at back, very convex; labellum purple, ample, with a long, curved, obtuse tail; mouth pure white; pedicels slender, glabrous, about 2in. long, generally aggregate. December. *l.* alternate, glabrous, 3in. to 5in. or more long, elliptic-ovate, acuminate, attenuated towards the base, coarsely serrated. Stem purplish-green, woody at base, herbaceous above. Fernando Po, 1862. Stove perennial. (B. M. 5366.)

I. candida (white). *fl.* white, slightly speckled with crimson, large, showy. Autumn. *l.* narrow-lanceolate, acuminate, with crimson serration, in whorls of three. *h.* 6ft. Himalayas, 1839. Hardy annual. (B. R. 1841, 20.)

FIG. 284. IMANTOPHYLLUM MINIATUM.

Impatients—*continued.*

I. chinensis (Chinese). *fl.* red; peduncles axillary, solitary or twin; spur long, filiform. July and August. *l.* opposite, sessile, lanceolate, setaceously serrated. *h.* 2ft. India, 1840. Greenhouse annual. SYN. *I. setacea.* (B. M. 4631, under name of *I. fasciculata.*)

I. cornigera (horn-bearing). A synonym of *I. glandulifera.*

I. flaccida (flaccid).* *fl.* rich purple, flat, about 2in. long. Summer. *l.* dark shining green, about 4in. long. Mountains of Malabar, Ceylon, &c., 1861. *h.* 6in. to 18in. Greenhouse annual. (B. M. 5276.) A pale purple-flowered form of this is figured in B. M. 5625, under name of *I. latifolia.*

I. f. alba (white) differs from the typical species only in having pure white flowers. Greenhouse annual. This form is frequently met with in gardens under the names of *I. Sultani alba* and *I. platypetala alba.*

I. fulva (tawny). *fl.* orange-colour, thickly spotted with reddish-brown, loosely panicled at the ends of the branches, hanging gracefully on their slender nodding stalks, the open mouth of the horn-shaped sepal upward; sac longer than broad, acutely conical, tapering into a strongly-inflexed spur. June to September. *l.* ovate or oval, coarsely toothed, petioled. *h.* 2ft. to 4ft. North America, but naturalised within the last half century in Britain, and spreading rapidly. Hardy annual. (Sy. En. B. 314.)

FIG. 286. FLOWERING SHOOT OF IMPATIENS BALSAMINA FLORE-PLENO.

I. glandulifera (gland-bearing). *fl.* rose, axillary, fascicled and shortly pedicelled; spur short, minute. August. *l.* whorled, lanceolate, glandularly serrate; stipules glandular. Ceylon, 1839. Greenhouse annual. (B. M. 4623, under name of *I. cornigera.*)

I. Hookeriana (Hooker's).* *fl.* white, streaked with crimson, large; petals broad. Winter. *l.* large, pale green. *h.* 2½ft. Ceylon, 1852. Stove perennial. (B. M. 4704.)

I. Jerdoniæ (Mrs. Jerdon's).* *fl.* large, axillary, six to eight in a cluster; sepals green, side ones bright yellow; pouch bright red. Summer. *l.* oval, disposed on the upper part of the gouty stems. *h.* 9in. East Indies, 1852. A rare but distinct and ornamental stove perennial species, which should have partial rest during winter. It requires an intermediate degree of moisture and temperature, and a situation near the glass. (B. M. 4739.)

I. macrophylla (large-leaved). *fl.* yellow, red; peduncles one-flowered, aggregated; spur short. July and August. *l.* large, alternate, ovate-acuminate, mucronate, serrate. *h.* 3ft. Mountains of Ceylon, 1838. Stove perennial. (B. M. 4662.)

I. noli-me-tangere. Touch-me-not. *fl.* yellow, spotted internally with red, large; peduncles three or four-flowered. July. *l.* ovate, coarsely toothed. *h.* 1ft. to 1½ft. Europe (Britain), Siberia, and West Asia. Hardy annual. (Sy. En. B. 313.)

I. pallida (pale). *fl.* pale yellow, sparingly dotted with brownish-red; sac dilated, and very obtuse, broader than long, tipped with a short incurved spur. July to September. *l.* ovate or oval, coarsely toothed, petioled. North America. Hardy annual.

I. platypetala (broad-petaled). *fl.* rose; petals transversely obcordate; peduncles one-flowered, shorter than the leaves; spur filiform, falcate. Summer. *l.* whorled, oblong-lanceolate, argutely serrated. *h.* 1½ft. Java, 1844. Stove annual. (B. R. xxxii. 68.)

I. p. alba (white). A garden name for *I. flaccida alba.*

I. pulcherrima (fairest). *fl.* red; peduncles two or three, axillary, one-flowered; spur filiform. July. *l.* alternate, ovate, setaceously serrated, glaucous beneath. *h.* 6ft. Bombay, 1848. Greenhouse annual. (B. M. 4615.)

I. repens (creeping). *fl.* bright yellow, large. Summer. *l.* small, very dark green. *h.* 1½ft. Ceylon, 1848. A compact-growing stove biennial, making an excellent basket plant. (B. M. 4404.)

FIG. 287. IMPATIENS ROYLEI, showing Top of Flowering Branch, detached Flower, and Young Seed Vessel.

I. Roylei (Royle's).* *fl.* purple, many-umbelled or short-racemed; standard two-lobed; wings broad; lip succate, very obtuse; spur short; peduncles sub-terminal. August. *l.* usually opposite and whorled, lanceolate or ovate-lanceolate, sharply serrate. *h.* 10ft. India, 1839. Hardy annual. See Fig. 287. (B. M. 4020, and B. R. xxvi. 22, under name of *I. glandulifera.*)

I. R. macrochila (large-lipped). *fl.* rose, terminal, umbellate. July and August. *l.*, upper ones alternate, ovate-lanceolate, serrate; petioles glandular. *h.* 8ft. North India, 1838. Plant erect. Hardy annual. (B. R. 1840, 8.)

I. R. moschata (musky). *l.* alternate and whorled, coarsely serrate, less glandular.

I. scabrida (scabrid). *fl.* yellow, with minute purple dots; peduncles two to six-flowered. July. *l.* lanceolate, cuspidately serrated, acuminated, pubescent. Stem purplish, slightly angular. *h.* 2ft. to 3ft. Himalaya, 1827. Hardy annual. SYN. *I. tricornis.* (B. M. 4051; B. R. 1840, 9.)

I. setacea (bristly). A synonym of *I. chinensis.*

I. Sultani (Sultan of Zanzibar's).* *fl.* scarlet; petals quite flat; dorsal (or standard) obovate-orbicular, retuse, rather smaller than the others; lateral petals cleft to the base into obovate-cuneate equal flat lobes; lip drawn out into a long, slender, curved spur. *l.* ovate-lanceolate, acuminate. Zanzibar. A glabrous, erect-branched, rather succulent, stove perennial herb, and an almost continuous flowerer. (B. M. 6643.)

I. S. alba (white). A garden name for *I. flaccida alba.*

I. tricornis (three-horned). A synonym of *I. scabrida.*

I. Walkeri (Walker's).* *fl.* scarlet (except two green outer sepals), 1¼in. to 1½in. long; anterior sepal somewhat pitcher-shaped, elongated, contracted below the mouth, attenuated at the other extremity into a conical, subulate, incurved spur; peduncles erect; pedicels long, slender. Winter. *l.* deep green, penninerved, 3in. to 4in. long, petioled, scattered, ovate or ovate-lanceolate, acuminate, tapering at base; margins serrated, and tipped with soft bristles. Stem deep purple, erect. *h.* 1ft. to 1½ft. Ceylon. Stove perennial. (B. M. 5237.)

IMPLEXOUS. Entangled; interlaced.

IMPREGNATION. The fertilisation of the ovule by the pollen-tubes. *See also* **Hybridising.**

INARCHING. *See* **Grafting.**

INARTICULATED. Without joints.

INCARVILLEA (named after P. Incarville, a Chinese Jesuit, and a botanical correspondent of Bernard de Jussieu, in the year 1743). ORD. *Bignoniaceæ.* A

Incarvillea *continued.*

genus, as now understood, containing three or four species of erect, greenhouse or hardy glabrous perennials, with racemose, bilabiate, tubular flowers. A mixture of loam, peat, and sand, or any light rich soil, will suit them. Propagated by divisions of the roots, or by seeds.

I. compacta (compact). *fl.* bright rose pink, disposed in clusters; corolla about 2½in. in length, funnel-shaped. Summer. *l.* unequally pinnate, with short, ovate-acute segments, fleshy, tufted or ultimately scattered. North-west China, 1881. Hardy. (R. G. 1068.)

I. Koopmannii (Koopmann's). A synonym of *I. Olgæ.*

FIG. 288. INCARVILLEA OLGÆ, showing Flowering Shoot and detached Single Flower.

I. Olgæ (Olga's).* *fl.* bright rose, produced in the upper axils, on very short stalks; corolla campanulate-infundibuliform, with short, rounded, spreading lobes. Summer. *l.* opposite, pinnate; segments narrow-oblong, pinnatifid. *h.* 3ft. to 4½ft. Turkestan, 1880. A very handsome hardy perennial. SYN. *I. Koopmannii.* See Fig. 288. (B. M. 6593; R. G. 1001.)

I. sinensis (Chinese). *fl.* nearly sessile, in loose terminal racemes; corolla scarlet, large. *l.* alternate, bi- or tripinnate; segments narrow. *h.* 1ft. to 2ft. China. Greenhouse.

INCISED. Regularly divided by deep incisions.

INCLINING. Bending forwards.

INCLUDED. Inclosed in anything.

INCOMPLETÆ. One of the divisions into which—for the requirements of systematic botany—the great class of Dicotyledons is divided. The corolla, and often calyx, is quite absent, and "suppression" is carried to its greatest extent. Some of the more important of the orders belonging to the division *Incompletæ* are: *Coniferæ*, *Cupuliferæ*, *Salicineæ*, and *Urticaceæ*.

INCURVED. Curved inwards.

INDEFINITE. In great number; stamens are said to be indefinite when they are too numerous to count.

INDEHISCENT. Not opening in a definite manner when ripe.

INDIAN BLUE. *See* **Nymphæa stellata cyanea.**

INDIAN CORN. *See* **Zea.**

INDIAN CRESS. *See* **Tropæolum majus.**

INDIAN FIG. *See* **Opuntia.**

INDIAN GARLAND FLOWER. *See* **Hedychium.**

INDIAN HAWTHORN. *See* **Raphiolepis.**

INDIAN MULBERRY. *See* **Morinda.**

INDIAN PINK. *See* **Dianthus chinensis.**

INDIAN SHOT. *See* **Canna.**

INDIARUBBER PLANT. *See* **Ficus elastica.**

INDIGOFERA (from *indigo*, a blue dye, and *fero*, to bear; on account of some of the species yielding the well-known dye). Indigo. ORD. *Leguminosæ*. A genus comprising 220 species of stove, greenhouse, or half-hardy herbs, shrubs, or sub-shrubs, the greater number of which belong to the African continent, but abound also in America and Asia, and a few extend to Australia. Flowers usually pink or purple, in axillary racemes or spikes; keel of corolla furnished with a subulate spur on both sides, at length usually bending back elastically. Leaves impari-pinnate or pinnate, rarely digitate or simple. Very few species of this large genus are in cultivation. They are propagated by seeds; or by firm cuttings of young shoots, inserted in sandy or peaty soil, under a hand glass, in a slight heat, in summer. *I. decora* is a very desirable greenhouse shrub of moderate growth, which flowers profusely in summer, and is one of the species most generally cultivated. The plants should be cut in, about February or March, and started in a little warmth, when any repotting should also be attended to. They may be hardened, to grow in a cold frame afterwards, and watered freely throughout the growing and flowering period. The wood should be thoroughly ripened by exposure, in autumn, and a season of rest allowed in winter. *I. Gerardiana* forms a compact bush in the open shrubbery, and is also well adapted for covering walls, where it makes better growths, and flowers more freely. It is one of the hardiest species. Indigoferas succeed in a somewhat rough compost of turfy loam and leaf soil. To insure an abundance of flowers, the wood must be well ripened.

I. angulata (angular). A synonym of *I. australis.*

I. Anil. Anil. *fl.* pinkish; racemes axillary, shorter than the leaves. Summer. *l.* pinnate, with three to seven pairs of oval or oblong leaflets, hardly pubescent beneath. Stems shrubby, erect. *h.* 2ft. to 4ft. West Indies and tropical America, previous to 1731. Stove. (B. M. 6506.)

I. atro-purpurea (dark purple). *fl.* dark purple, crimson; racemes axillary, slender. August. *l.* pinnate, with five to seven or ten pairs of oval, retuse, mucronulate leaflets, rather undulated on margins. *h.* 5ft. Nepaul, 1816. Half-hardy shrub. (B. M. 3065; B. R. 1744.)

I. australis (Southern).* *fl.* rose-coloured; racemes rather shorter than the leaves. March to June. *l.* pinnate, having five to seven pairs of elliptic obtuse, glabrous leaflets. Stem shrubby. *h.* 3ft. to 4ft. Australia, 1790. A handsome greenhouse species, with a neat habit; it is an excellent pot plant. SYNS. *I. angulata* (B. R. 891), *I. sylvatica* (B. M. 3000). (B. R. 386; L. B. C. 140.)

I. decora (comely). *fl.* reddish, disposed in dense racemes. Spring and summer. *l.* pinnate; leaflets two to six pairs, ovate, obtuse, mucronate, and with a few peltate hairs beneath. *h.* 3ft. China, 1844. Greenhouse evergreen shrub. (B. M. 4546; B. R. 1846, 22.)

I. d. alba (white).* An elegant variety, with long racemes of white flowers; it thrives well, and proves almost hardy, when planted against a wall.

I. Dosua (Dosi swa). *fl.* bright red; racemes axillary, shorter than the leaves. Summer. *l.* pinnate, having ten to fifteen pairs of oval, retuse, mucronulate leaflets, which, as well as the branches, are clothed with rufescent hairs on both surfaces. *h.* 1½ft. India. Greenhouse.

I. floribunda (profuse flowering). A garden name of *I. Gerardiana.*

I. Gerardiana (Gerard's).* *fl.* pale red, in distinctly stalked, twelve to twenty-flowered racemes. July. *l.* shortly stalked, pale grey green, glabrous and hoary below. India. A low, much-branched shrub, perhaps the hardiest species. SYN. *I. floribunda*, of gardens. (B. R. 1842, 57, under name of *I. dosua.*)

I. sylvatica (sylvan). A synonym of *I. australis.*

I. tinctoria (dyer's).* *fl.* with a pale vexillum, and red keel and wings; racemes axillary, shorter than the leaves. July. *l.* pinnate, with four to seven pairs of obovate leaflets, which are pubescent beneath. Stem suffruticose, erect. *h.* 3ft. to 6ft. East Indies, 1731. Stove. This is the most universally cultivated of all the species.

I. violacea (violet). *fl.* purple, red; racemes axillary, longer than the leaves. Summer. *l.* pinnate, with five pairs of obovate-elliptic, flat, slightly pubescent leaflets. *h.* 3ft. East Indies, 1818. Half-hardy. (B. M. 3326.)

INDUMENTUM. The hairy covering of plants, of whatever kind.

INDUPLICATE. Having the margins bent abruptly inwards, and the external face of these edges applied to each other without any twisting.

INDUSIUM. The membranous cover which overlies or underlies the sporangia of ferns. The name is also applied to the annulus of some fungals.

INERMIS. Unarmed; destitute of any kind of spines or prickles.

INFERIOR. Growing below some other organ. The ovary, or fruit, is said to be Inferior when it is crowned by the calyx, petals, and stamens.

INFLORESCENCE. The disposition of the flowers.

INFRACTOUS. Curved inwards.

INFUNDIBULIFORM. Funnel-shaped.

INGA (the South American name of one of the species). ORD. *Leguminosæ.* A genus comprising 140 species of stove unarmed shrubs or trees, natives of the warmer parts of South America, principally of Guiana and Brazil. Flowers usually white or yellowish, produced in spikes or nearly globular heads, from the axils of the leaves. Leaves abruptly pinnate, composed of from two to five or six pairs of rather large leaflets. The species, with the exception, perhaps, of *I. pulcherrima*, are very rarely seen in cultivation. They thrive in a compost of peat and loam, and plenty of moisture will be needed during the summer months, but scarcely any in winter. Increased by cuttings, made of the young shoots, in spring and summer, and inserted in sandy peat, under a bell glass, in heat.

I. macrophylla (large-leaved). *fl.* yellow. *l.* bipinnate, of two pairs; leaflets ovate, acute, smooth, shining above, a gland between each pair; petiole winged. *h.* 20ft. Cumana, 1815. (B. M. 5075.)

I. pulcherrima (fairest). *fl.* scarlet, disposed in solitary, pedunculate, pendulous heads. Summer. *l.* with four or five pairs of pinnæ; each pinna bearing from twenty to twenty-six pairs of small, linear, obtuse, closely imbricated, adpressedly-ciliated leaflets. Branches slender, spreading. *h.* 10ft. Mexico, 1846. (P. M. B. v. 147.)

INKBERRY. An American name for *Ilex glabra.*

INOCARPUS (from *is*, *inos*, a fibre, and *karpos*, a fruit; in reference to the fibrous envelopes). ORD. *Leguminosæ.* A genus comprising three species of stove evergreen trees, natives of the Pacific islands and the Indian Archipelago. Flowers yellow, in axillary spikes; calyx tubular; petals five. Leaves simple (one-foliolate), coriaceous, penninerved; petioles very short. The species require a compost of loam and peat. Cuttings of the half-ripened shoots will root in sand, in heat.

I. edulis (edible). *fl.* white; petals five, united to form a short tube. Summer. *fr.* a one-seeded fibrous pod. *l.* alternate. *h.* 20ft. South Sea Islands, 1793.

INSECTICIDES. The prompt destruction of injurious insects, immediately any are detected, is an important and essential operation to be performed in connection with all cultivated trees and plants. Insects of the most minute description increase with such rapidity, if left alone, that irreparable damage is soon caused to any subject they infest. An Insecticide is any composition prepared from ingredients destructive to insect life. Some Insecticides, too, are useful in checking or destroying low forms of parasitic plant life, such as Mildew, &c. To be effective and available for use on plants, it must be fatal to insects without in any way injuring the host. Plants which are leafless, and in a dormant state, will bear being washed with an Insecticide nearly or quite double the strength they could withstand when in full leaf; hence the importance of thoroughly cleaning plants, and also the house, during winter, when insects increase less rapidly than at other seasons, and are more concentrated on those parts of deciduous plants which remain. Tobacco, in one form or another, is, perhaps, the most useful substance entering into the composition of Insecticides. It may be soaked in water, for

Insecticides—*continued.*

dipping plants, and the preparation made to any strength desired; used as a dry, ground powder, for dusting over the leaves or points of shoots; or burnt in houses, for the destruction of insects by the smoke. Soft Soap is a cheap and excellent Insecticide, used in many gardens to the exclusion of all other preparations. It may be readily dissolved in water at any time, and to any required strength, according as various plants may be able to withstand it. An ounce, or even less, to a gallon of water, will generally be sufficiently strong to use for sponging the leaves, or for dipping plants in. Nicotine Soap has some of the properties of tobacco; it is a good Insecticide, and may, when purchased, be readily prepared for use. Gishurst Compound, an old and well-known composition, in frequent use, and Fir-tree Oil, are soluble and useful Insecticides for general purposes. Directions for preparing them accompany each box or bottle sold; and it is rather important that they be followed, as far as possible, especially in the use of soft water. Petroleum—erroneously called paraffin, a different article—is very destructive, especially to Mealy Bug; but, unfortunately, it is insoluble in water, and requires very careful application. A small wineglassful to three gallons of water, is not too much in many instances; but it must be thoroughly mixed with the water by constant agitation, preferably with a syringe. Hellebore Powder is sometimes employed as an Insecticide, more particularly for the destruction of the Gooseberry Caterpillar; but, being a deadly poison, it must be carefully handled, and be afterwards washed off with clean water. Flowers of Sulphur, used either dry or mixed with water, is one of the best things for destroying or preventing the spread of Mildew. There are various other Insecticides sold, but those already noticed are mostly in general use, and answer their purpose, when properly applied, so far as can be expected of preparations. Their use and effect with, and on, different plants can only be treated of individually and after experience gained from experiments made according to the directions usually accompanying the respective preparations.

It is much preferable to avoid, as far as possible, the use of Insecticides, especially those applied in a liquid state, as it is frequently a difficult matter, even with careful precautions, to kill insects entirely, without, at the same time, causing injury to the plants infested by them. If due care and attention be paid to watering, syringing, and ventilation, as well as proper repotting, &c., insects will not give much trouble. When the use of an Insecticide becomes requisite, it should be promptly applied, choosing an evening or a dull day for the operation, and afterwards removing all traces by clear water. Insect Powder—of which the basis is composed of the dried and powdered leaves and flowers of *Pyrethrum roseum* and *P. cinerarifolium*—is effective when dusted on infested plants.

INSECTS. No other class of the animal kingdom is of so much interest and importance to those engaged in gardening, or in farming, as are Insects, which, in their countless forms and modes of life, force themselves upon the notice of even the least observant. The destruction they cause to field and garden produce is great, and at times excessive; and these attacks can be met successfully only when means are used that are based on a knowledge of the habits of the injurious species. But while Insects are more conspicuous because of the injuries they inflict on our fields and gardens, we must not forget that many kinds are beneficial to plants, either by the services they render in conveying pollen from flower to flower, and thereby securing the production of healthy offspring to the plants; or by feeding on, and thus destroying, the injurious kinds of Insects. Were it not for the aid rendered to us by the parasitic species, we must often be helpless to check the ravages

Insects—*continued.*

of the others, which, despite this aid, are often but too wide-spread and serious.

Space will not here permit of more than a very brief sketch of some of the leading points in the structure and life-history of the class and of its leading orders, with a mere indication, in the most general terms, of the more conspicuous damage done by them, and of the means of remedy generally applicable; but fuller information will be found plentifully scattered through this work under the various headings referred to below.

The word "Insect" literally means any animal which has the body so divided as to seem cut into successive parts, usually resembling rings of hard substance, connected by soft skin. The name has been used to include all the animals with bodies resembling a row of joints, even Worms having been at one time included among Insects, along with Spiders, Mites, Crabs, Woodlice, and Centipedes. At the present time, the name is confined to a considerably smaller group of animals—the true Insects—though some authorities still include with these the other groups named above, except Worms. In this restricted sense, the class of Insects is composed of animals that possess a jointed body made up of a number (twenty or twenty-one) of rings of horny substance (chitine), connected by skin, so united as to form three great divisions in the body, viz., the head, the thorax, and the abdomen; that have antennæ, or feelers, on the head, and three pairs of horny jointed legs, and usually two pairs of wings, on the thorax; that breathe by tubes (tracheæ) all through the body and limbs, which tubes open on the surface of the body by small holes (spiracles); and that, in course of growth, pass through a succession of changes (metamorphoses), beginning with the egg, and going on through the stages of larva and pupa (chrysalis), before assuming the perfect condition (imago), in which alone they present all the characters enumerated above. This series of changes may be of two kinds. In one, the larva, on emerging from the egg, resembles the mature Insect in form, and differs from it only in size, and in the entire absence of wings; while the pupa differs from the mature Insect only in the wings, though indicated, being small and rudimentary. Both larva (see Fig. 314) and pupa are also sexually immature. This kind of metamorphosis is said to be incomplete. Complete metamorphosis differs

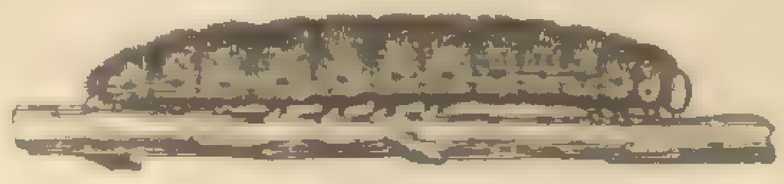


FIG. 289. LARVA OF SMALL CABBAGE BUTTERFLY.

FIG. 290. LARVA OF LEOPARD MOTH.

from this in the larva (see Figs. 289, 290, and 291) being quite unlike the mature Insect. Very generally, it resembles a worm in its form. It may have a distinct head, and the rings of the body, though like one another, may differ in the three immediately behind the head each bearing a pair of horny jointed legs, while those of the hinder part of the body may bear skinny suckers (prolegs) — the number varies considerably, and they may be quite absent. Larvæ of this type (see Fig. 291) are called Caterpillars, and are met with among the Butterflies, Moths, and Sawflies. Another group of Insects, in the larval state, are footless creatures, frequently

Insects—*continued.*

scarcely showing even a trace of a head. Such larvæ are familiar to everyone under the name of maggots or grubs, *e.g.* those of Bees, Flies, &c. (see Fig. 311). The pupæ of Insects that undergo a complete metamorphosis are not able to move about or to feed, but remain helpless for a longer or shorter period, while changes are going on within, which result in the development of the perfect insect (imago), showing all the distinctive characters already set forth. These quiescent pupæ differ much from the larvæ (see Fig. 309), as they show the

FIG. 291. LARVÆ OF ROSE-LEAF SAWFLY.

future limbs (antennæ, legs, and wings) of the imago, though these parts are still useless, and of very small size. The Butterflies and Moths, while pupæ, have the whole body enveloped in a hard crust, which binds down all the parts immovably to the body, leaving only a slight power of movement in the hinder rings. When the pupa is helpless, its safety is generally provided for by the larva forming a cell or cocoon of silk, earth, or other material, compacted with a cement from its mouth, in which the pupa lies concealed till the imago breaks out from it, and crawls to the outer air, with wings at first crumpled and useless, but soon expanding and becoming firm to carry it in flight through the air. Whatever the degree or kind of metamorphosis undergone by it, the Insect, in its progress from the egg to maturity, grows frequently with enormous rapidity. The outer coat of the body is too rigid to allow of the corresponding extension in it; but the difficulty is met by the larva several times (four times or oftener) throwing off its skin. The old skin separates from the body of the larva, it splits along the back in front, and the larva wriggles its way out, frequently with a skin of a very different colour from that in which it had previously shown itself. In like manner, the skin of the pupa bursts to set free the imago.

The sudden and mysterious appearance of certain kinds of Insects at one time led to the belief that they must be produced by spontaneous generation from dead and decaying substances; but the progress of accurate researches into their life-histories has proved conclusively that they always originate from parents, though at times, in the case of certain Insects, *e.g.*, several of the true Gall-flies of the Oak-tree, the parents and the immediate offspring may differ considerably in appearance. The females produce eggs, except in a few groups, such as the Aphides, in which the young Insects may be brought forth, not sexually by eggs, but by a process of budding. In the case of a few other Insects, the eggs are hatched while still within the body of the mother, which thus gives birth to living young or larvæ. The fact that Insects are always produced from parents, renders it of the utmost importance, when dealing with the injurious species, to become familiar with the habits of the females as well as of the larvæ, which latter are usually the destructive agents, and are therefore the more

Insects—*continued.*

generally observed by gardeners and agriculturists. Such a knowledge frequently enables us to devise means of warding off the damage that would otherwise be unavoidable, and of assailing the destroyers in the most effective way.

The following details of structure have reference only to mature Insects:

Mouth. In its essential structure, the mouth consists of certain parts, six in number, though some of them bear appendages. These parts may undergo great modification, and may be adapted to very different uses, so as to be hardly recognisable when compared with the mouth of one of the more typical forms. The chief modifications will be treated of under the various groups of Insects; it is here only necessary to describe the parts of the mouth of a Beetle, selecting this as a type because of all the parts of a fully-developed mouth being well seen in Beetles. In them, the mouth is formed by an upper lip (labrum), two pairs of jaws working horizontally like the blades of scissors (called mandibles and maxillæ, or upper and lower jaws respectively), and a lower lip (labium). The mandibles are specially adapted for cutting the food to be taken into the mouth. The maxillæ are not so strong, and often bear tufts of hair to serve as brushes. Each also bears a jointed body (palpus), which seems to serve as a sense-organ. The lower lip bears a pair of similar jointed bodies (labial palpi).

Limbs. The middle division of the body (thorax) bears the limbs, viz., three pairs of jointed legs on the lower surface or breast, and two pairs of wings, attached to the upper surface of the two hinder of the three rings of which, closely consolidated, the thorax is made up. The legs are generally present, though, in some Insects, one or more pairs may be ill-developed, or even entirely absent. They vary in relative size, and in the number of parts of which they are made up; but they are of less importance in giving characters for the orders than are the wings. The latter organs, in their typical condition, *e.g.*, in *Hymenoptera* or in *Lepidoptera*, are two pairs of broad membranes, supported upon nervures traversed by breathing-tubes (tracheæ). The upper or front pair almost always exceed the lower or hind wings in size and in complexity of neuration, but resemble them as regards texture and general appearance. In several groups, however, this typical structure is departed from, as will be more fully stated below. Not a few Insects either have the wings small and utterly inefficient (as the female Winter Moth, see Fig. 294), or altogether absent (as Fleas and many other parasitic Insects).

Periods of Destructive Activity. As a general rule, the larvæ, during their rapid growth, are far more hurtful to vegetation than are the perfect Insects; in fact, certain of the groups of Insects are unable, in the perfect state, to feed upon plants, save by sucking up the nectar or honey contained in the flowers, *e.g.*, the whole group of *Lepidoptera*. Yet these same Insects, in the larval stage, were once provided with strong jaws, well fitted to cut their food, and then probably fed voraciously upon their food-plants. But among the groups provided with a mouth suited for chewing (*e.g.*, Beetles and *Orthoptera*), or for puncturing the tissues of plants and sucking the juices (*Hemiptera*, particularly Aphides), the perfect Insects may be almost as destructive as the larvæ; indeed, some kinds are not injurious to man except in the mature condition.

General methods of prevention and of remedy against damage from Insects, may be treated of here; but details as to these practices must be sought under the special headings. The methods employed to prevent attacks must depend on the habits and modes of life of the Insects to be dreaded. Of course, the destruction of the creatures, either as larvæ, pupæ, or mature Insects, before they have laid their eggs, is the most certain means. This may be effected either by direct efforts, such as hand-picking, or applications of poisonous solutions or gases to them; or else — and probably with greater, if less apparent, success—by making use of the natural means of checking their undue increase. Among the most efficient of these natural means are birds and parasitic Insects, both of which destroy vast multitudes of the more hurtful kinds in all their stages. Much has been written, and earnest have been the disputes that have been waged, regarding the relation of birds to agriculture and to gardening. While some writers have represented them as frequently most destructive to the crops and to fruit-trees, others have as strenuously upheld their great value as natural guardians of these crops and fruit-trees from the ravages of swarms of Insect foes. In these, as in so many other disputes, the truth probably lies between the extremes: but, while admitting, as we must admit, that birds are, at certain times of the year, more hurtful than beneficial to farmers and gardeners, yet the danger from them at these times may be comparatively easily guarded against; while the benefits conferred by them, during the rest of the year, are so great as far to outweigh any damage done by them. It must be remembered, moreover, that injury is done only by those birds that feed on fruits or seeds, such as blackbirds, sparrows, and many finches; or on roots or tubers, such as rooks; and that even these birds almost all feed largely on Insects also. On the other hand, many species of slender-billed birds may be said to live exclusively on Insects throughout the year, or such part of it as they spend with us. Some birds, like the bullfinch, are in the habit of pulling off the young buds of the fruit-bearing bushes and trees; but this seems to be done in the search for larvæ hidden in the buds, and which, if left in them, would destroy them in any case. In like manner, the apparent injury done to trees by woodpeckers boring into the trunks, is not really such, as the holes are bored by the bird to reach and to extract the larvæ of Insects hidden away in tunnels in the wood, or between the wood and the bark, and which, if left there, would have done no less injury; while, if they had reached maturity, they would have reproduced their kind, to the further detriment of the trees.

Even more efficient than the birds, in reducing the numbers of the injurious kinds of Insects, are the parasitic species of Insects; though, from their small size and unobtrusive habits, they are readily overlooked, and the work done by them undervalued. Among these, some devour the Insects or suck out their juices as food. As examples of these may be noted the Ground Beetles, and the larvæ of

FIG. 292. LARVA OF LADYBIRD.

the Ladybird Beetles (see Fig. 292) and of the Lacewing Flies, which devour the Green Flies, or Aphides, in myriads. Other insects (*e.g.*, some Solitary Wasps) carry off small Caterpillars, &c., to serve as food for their offspring. But far more important than even these are the parasites that deposit their eggs upon or in the body of some Insect, generally a larva, there to disclose the grubs. The latter live in the interior of their host, eating the fat, but leaving untouched the vital organs, till at last, when growth has been completed by the parasites, they either form cocoons inside its body, or else burrow out through the skin, to become pupæ in some concealment, where, though helpless, they may remain safe. True parasites of this latter sort belong, with rare exceptions, to the *Diptera* or

Insects—*continued.*

Two-winged Flies (*Tachina* and allied genera), or to certain divisions of the *Hymenoptera*. In this latter order, some groups, with very numerous kinds in each, are entirely, or

FIG. 293. ICHNEUMON FLY.

almost entirely, confined to parasitism (Ichneumons—see Fig. 293—and *Chalcididæ*), and many species in the other groups of the order are also parasites. In fact, it may almost be said that there are few Insects which are not preyed on by one or more (and frequently by many) of these minute parasites. It is hardly in our power to do anything directly to increase the numbers of these allies; but it is well to be able to recognise their general appearance, and to refrain from killing them.

In many cases, however, we must not trust to the efforts of birds and Insects to limit the numbers of our Insect foes. When their attacks are severe, it is necessary to remove or to destroy them more rapidly than can be done by natural agencies; and, though the methods employed must be varied to suit the special circumstances that call for them, yet the same methods are largely applicable for the destruction of many kinds of Insects. A few of the more generally useful may be mentioned here. Tobacco smoke is very fatal to many of the hurtful Insects, where these attack plants under cover, *e.g.*, in greenhouses. It is especially efficacious against Aphides. Either strong coarse tobacco, or the paper in which it has been wrapped, is burned in the place to be freed from the foe; the doors are all kept closed during the operation, and for some time afterwards. Infusions of tobacco, of Hellebore, or of other insecticides, are sometimes prepared, and are scattered over the plants by means of a watering pot or syringe. These applications are usually very fatal to larvæ feeding on such parts of plants as allow of the solution being properly applied to them, and they do not injure the host. Scale, and other Insects that lie closely adherent to leaves or branches, are seldom much affected by tobacco smoke, and they are best removed by washing the parts with water, or with solutions of soft soap or of poisonous substances; and the efficacy of the applications is increased by using a brush to put them on with. Several kinds of injurious larvæ are in the habit of living in groups, in or under webs. These are easily cleared away with the webs; and the whole should be destroyed, by burning or otherwise. Larvæ living in the interior of branches, or in galls, cannot be reached without removing the injured structures; and this is also usually the case with root-feeders. When a plant is withering without any apparent cause, the removal of the earth from its root will, at times, disclose the hidden larva that has been feeding there. Sometimes, also, larvæ feed at night on the leaves, and during the day hide themselves in the earth. Hence, the depredators can be detected only at night, by the use of a lantern. Many Insect larvæ roll up a leaf, or spin together two or three leaves, so as to form a protection for themselves against all means of destruction save hand-picking; but, fortunately, such larvæ are seldom fatal in their attacks; though, frequently, the plants become very unsightly under them. Trees and shrubs are attacked in this way more often than are herbaceous plants. A severe shaking will often cause a large number of the larvæ to drop from their tubes, and to hang suspended in the air by silken threads till the danger is past, when they remount by their threads. If a sheet is spread below

Insects—*continued.*

the tree, they may be shaken on to it, and then readily gathered to be destroyed. The mere shaking of the plant is not enough. Many larvæ (*e.g.*, those of Gooseberry Sawflies, of Winter Moth, &c., fall to the ground when full fed, there to burrow in order to form cocoons, and to become pupæ, within a very little distance of the surface of the ground. Soot, gas-lime, and other nauseous materials are often spread on the soil around the stems of trees and shrubs, to prevent the larvæ from burrowing in the immediate vicinity of the plants, and to destroy them by the poisonous properties of the substances. The pupæ may be greatly lessened in number by paring off and burning an inch or two of the surface soil in the autumn or winter. Opening the soil with a hoe or a rake is also useful, as it destroys some pupæ at once, and exposes others to the chance of being eaten by birds, and to unfavourable conditions during the winter. The females of some of the more hurtful Insects are wingless, or have wings so small as to be of little or no

FIG. 294. MALE, FEMALE, AND CATERPILLAR OF WINTER MOTH.

use (as the Winter Moth, see Fig. 294); they must, therefore, crawl up the plants on which they lay their eggs; and their path may be barred by placing a ring of any sticky substance on the soil around the base of the stem, or around the stem itself. Tar, or mixtures of tar with materials to prevent its drying quickly, have been used with success to form such barriers. Other methods of treatment, suitable to particular cases, will be found referred to under the names of the various insects. *See also* **Insecticides.**

The class *Insecta* has been divided into certain great groups, called "orders," by means of characters taken mostly from the structure of the mouth and of the wings, and from the kind of metamorphosis they pass through in their growth. These orders are well distinguished from one another, and there is usually not much difficulty in determining the group to which any Insect belongs. Some orders are of far greater importance to gardeners than are others; and to them the following remarks are confined. These orders are as follows:

Coleoptera, or *Beetles*. These have the mouth formed

Insects—*continued.*

for biting, with all the parts well developed; the body is usually incased in a hard crust; the front wings are modified to form hard coverings (elytra) extending over the hinder part of the body, and serving to protect the hind

FIG. 295. ROSE-CHAFER, with Hind Wings extended.

wings, which remain membranous for flight (see Fig. 295). The metamorphosis is complete, *i.e.*, the larva is very

FIG. 296. LARVA OF COLORADO BEETLE.

FIG. 297. COLORADO BEETLE.

unlike the adult Insect (see Figs. 296 and 297), and the pupa is helpless. At times, the larvæ of Beetles are hurtful (*e.g.*, those of the Click Beetle and of the Colorado Beetle); but the mature Insects are more often to be dreaded. *See also* **Cockchafers, Ladybirds,** and **Turnip Fly.**

Several kinds of Beetles are useful to gardeners, since they feed on hurtful Insects, either as larvæ, or in the perfect state. Of these useful forms we may mention

FIG. 298. COMMON GROUND BEETLE.

the following: The Ground Beetles (see Fig. 298) feed mostly on Insects, though some of them are partly vegetarians, and *Harpalus ruficornis* has been found eating Strawberries in large numbers. The Tiger Beetles, and the Devil's Coach Horses or Rove Beetles (see Fig. 299), feed largely upon decaying matter; but many kinds are of much assistance by destroying noxious insects. The Glow-worm (*Lampyris noctiluca*), in the larval state,

Insects—*continued.*

feeds on snails, mostly of the genus *Helix*, following them into their shells to devour them. It removes the slime encountered in this mode of life, by means of a kind of brush specially suited to its needs. The larvæ

FIG. 299. DEVIL'S COACH HORSE.

of the Ladybirds are very useful because of the number of Green Flies eaten by them. The modes in which Beetles inflict injury on garden and field produce, are very various. Frequently, the roots are attacked, and much injured, or entirely destroyed, usually by larvæ,

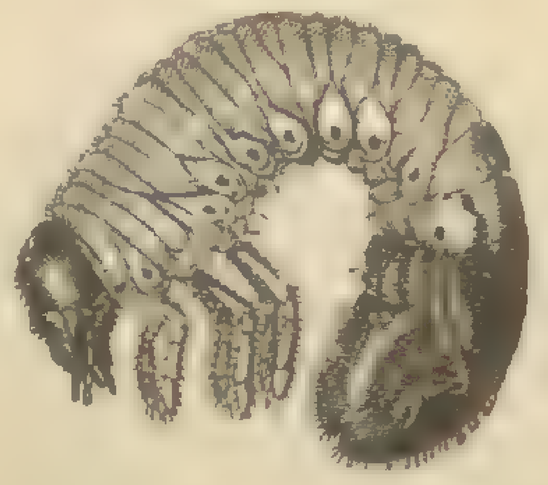


FIG. 300. GRUB OF COCKCHAFER.

e.g., of the Cockchafer (see Fig. 300). The stems are injured, chiefly by those kinds (Bark Beetles) that bore between the bark and the wood, separating the bark, which soon dies. A few make galls, on roots or stems, *e.g.*, Cabbage Weevil, or in seed vessels. Others attack the leaves, either while larvæ (Lily Beetle), or as Beetles (Turnip Fly); while others live as larvæ in the seed vessels, eating out the contents of the seeds, and thus rendering the crops a failure while in the soil, or after they have been harvested, *e.g.*, Bean Beetle.

Orthoptera. In this order are included Insects with mouths fitted for biting, wings net-veined, front wings like parchment in thickness, long and narrow, serving to protect the large membranous hind wings; metamorphosis incomplete, the larvæ resembling the parents except in

FIG. 301. HOUSE CRICKET.

size, and in having no trace of wings. This order includes Locusts, Crickets (see Fig. 301), Grasshoppers (see

FIG. 302. GREEN GRASSHOPPER.

Insects—*continued.*

Fig. 302), Cockroaches (see Fig. 303), and Earwigs; though some place the last-named Insects in a separate

FIG. 303. FEMALE COCKROACH.

order, called *Euplexoptera*, because of the very neat folding of the hind wings below the front ones. The *Orthoptera* are destructive during every stage after leaving the egg, and in warm countries they do excessive damage at times. In Britain, they cannot be regarded as of great consequence; though Cockroaches may gnaw the greenhouse plants, and Earwigs are rather hurtful to florists' flowers, and require to be kept in check (*see* **Cockroaches, Crickets,** and **Earwig**). With the *Orthoptera* may also be classed the genus

FIG. 304. THRIPS (magnified).

Thrips (see Fig. 304)—a genus of very small Insects, which live in flowers, and gnaw the surface of the petals (*see* **Thrips**).

Neuroptera are at once far less numerous in species and in individuals, and practically less important than are the orders already discussed. None of the Insects in it can be said to be hurtful to plants. On the other hand, they are frequently of much service, since several of them feed on Insects, and destroy large numbers of injurious kinds. The order is characterised by the possession of four wings, all alike membranous, and supported on a complex network of nervures; a mouth fitted for biting. Certain of the sub-orders undergo only an incomplete metamorphosis, while in others the metamorphosis is complete. The larvæ are provided with six jointed legs. *Neuroptera* are mostly carnivorous, alike in the larval state and when mature. Among the better-known forms may be noted Dragon Flies, Hemerobius, and Lacewing Flies.

Hymenoptera have the wings all membranous and naked, and supported on branching nervures, the hind wings being the smaller; the wings bear no scales. The mouth has jaws for biting; but in some of the sub-divisions of the order, certain parts of the mouth are modified to serve for licking up honey from flowers (in Bees, Wasps, &c.). They all pass through a complete metamorphosis. The larvæ vary much in form, often being like maggots (Bees, &c.), while the Sawflies have larvæ not unlike the caterpillars of Moths. Sawflies are very injurious to plants, many of them being hurtful to garden and field produce (Turnip Sawfly, Gooseberry Sawflies, &c.). Some of the Sawflies make true galls on Willows; and many of the *Cynipidæ*, or Gall-flies (see Figs. 305 and 306), make galls on Oak, Maple, Roses, &c. Most of the *Hymenoptera*

Insects—*continued.*

are of much use in limiting the number of injurious Insects; and among these useful species the Ichneumons hold the first place. In the mature state, none of the

FIG. 305. GALLS AND INSECTS OF RHODITES ROSÆ, showing (1) Entire Bedeguar Gall; (2) Bedeguar, cut open; (3) Grub, natural size; (4) Head of Grub, magnified; (5) Pupa, magnified; (6) Insect, magnified.

Hymenoptera can be said to be really injurious to plants; while many are of great value in conveying pollen from flower to flower. However, Humble Bees are found at times to injure the flowers, by boring through the tube

FIG. 306. OAK GALL-FLY (magnified). The figure below, and to the right, represents the hinder rings of the Abdomen, and the Ovipositor, which serves to pierce the plant tissues, still more magnified.

of the corolla to gain readier access to the honey contained therein. *See also* **Ants, Galls, Honey Bee, Humble Bee, Ichneumon Flies,** and **Sawflies.**

Lepidoptera have the wings usually large (see Figs. 307 and 308), membranous, and covered all over with small scales; the mouth is of no use for biting but has the lower jaws (maxillæ) prolonged, so as, when placed together, to form a tube, adapted for sucking honey from flowers. The metamorphosis is complete. The larvæ (see Figs. 309 and 310) are of the form known as Caterpillars; and, apart from points of minor importance, vary chiefly in the number of sucker feet on

Insects—*continued.*

FIG. 307. LARGE WHITE CABBAGE BUTTERFLY.

the hinder rings of the body. This order includes the Butterflies and Moths. They are not injurious in their

FIG. 308. FEMALE GIPSY MOTH.

mature condition; but all the larvæ feed on plants, and many of them are very hurtful in gardens. *See also*

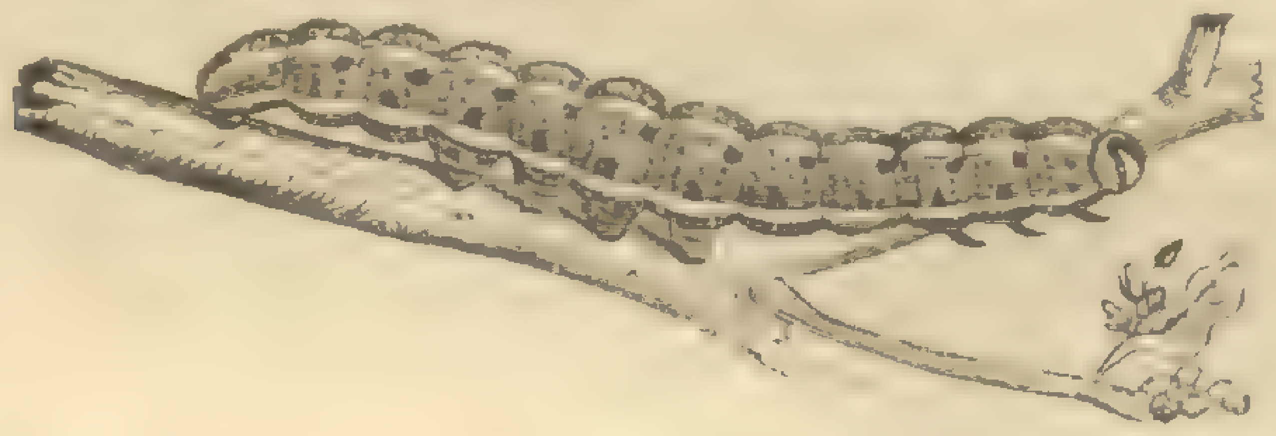


FIG. 309. CATERPILLAR OF LARGE CABBAGE BUTTERFLY.

Hybernia, Tortrix, Turnip Moth, Winter Moth, and others referred to above.

FIG. 310. CODLIN MOTH AND GRUB.

Diptera, or Two-winged Flies, have only one pair of wings, which are membranous and naked, with comparatively few nervures. The hind wings are replaced by

Insects—*continued.*

very small stalked knobs (halteres or poisers). The mouth varies, being in some suited for sucking, in others for biting; in many, the jaws are fitted to pierce the skin of animals, and thereafter to form suckers for drawing out the blood. The metamorphosis is complete. The

FIG. 311. ONION FLY, LARVA, AND CHRYSALIS, magnified.
(The lines alongside indicate the natural sizes.)

larvæ are maggots or footless grubs (see Fig. 311). They vary exceedingly in mode of life, many of them living in the interior of roots, stems, or leaves of plants; others form galls on plants; others feed on decaying matters; while yet others live as parasites in the bodies of animals, especially in Insects. Others (*Syrphidæ*), as larvæ, feed on the Aphides, and aid in reducing their numbers. The

FIG. 312. CRANE FLY.

larvæ of the Crane Flies (see Fig. 312) are but too well known to farmers under the names of Grubs and Leather Jackets. The Gnats live in water during their larval condition; the pupæ are very generally oval brown bodies. The *Diptera* are seldom of large size. *See also* **Crane Fly, Onion Fly,** and **Syrphus.**

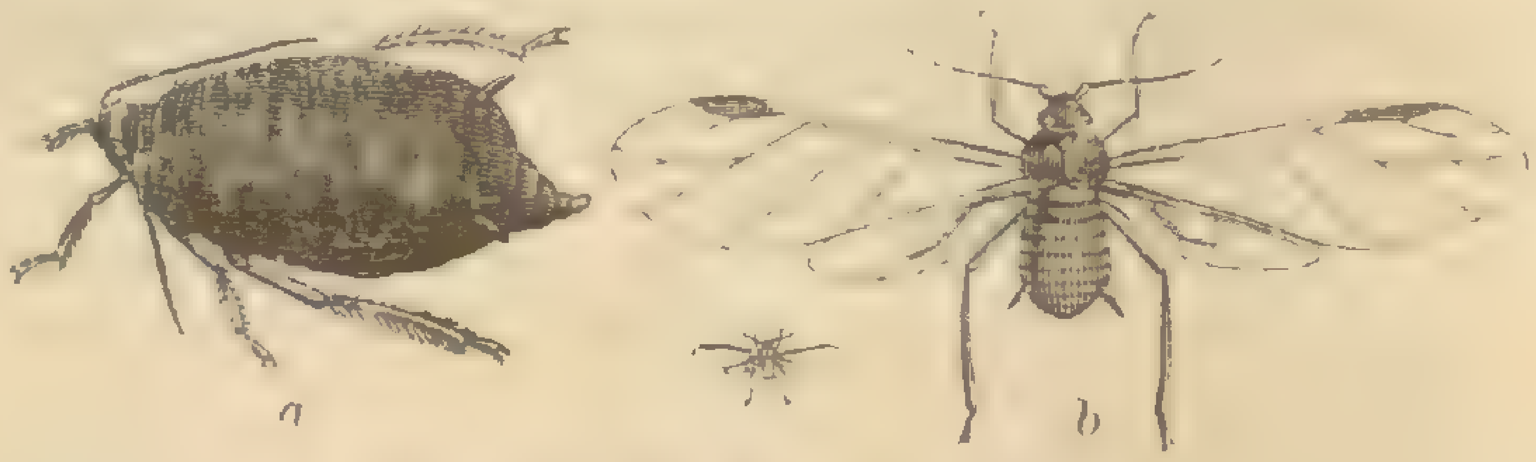


FIG. 313. BEAN APHIS.
a, Female (magnified); *b*, Male (natural size and magnified).

Hemiptera have the mouth in the form of a beak, turned down so as to lie against the breast when not in use, but capable of being driven into their food when desired. This beak usually consists of a sheath, in which lie four bristle-like pieces, the whole serving for a sucker to draw in the juices on which they feed. The metamorphosis is incomplete, except in the male Scale insects. The wings are different in the two great sub-orders, and a great many of the Insects have no trace of wings. The sub-orders are:

Heteroptera, or *Plant Bugs*. The hind wings of these are

Insects—*continued.*

membranous, and hidden under the front ones. The latter have the half nearer the body leathery, that farther from the body membranous, giving the appearance of the wings being in halves, whence the name *Hemiptera*, or half-winged insects. The name *Heteroptera* refers to the dissimilar appearance of the two halves. In this sub-order, many of the species are more or less parasitic;

FIG. 314. FROG HOPPER, showing Larva, Frothy Secretion, and perfect Insect.

while among those that feed on plants, there are few that can be said to be conspicuously hurtful.

Homoptera have the wings all membranous and naked, with few supporting nervures, and often resemble small *Hymenoptera* in general aspect (see Fig. 313). A great many species are wingless, or, at least, have wing-

FIG. 315. GRAPE OR VINE LOUSE, showing (A) Infested Vine Root; (B) Portion of Leaf, with Galls; (C) Subterranean Form of Female (magnified).

less individuals as well as winged (see Figs. 313 and 315). The name *Homoptera* refers to the front wings being alike throughout (see Figs. 313 and 314). The insects are mostly very small, but include many injurious forms. *See also* **Aphides, Frog Hopper, Grape Louse,** and **Scale Insects.**

INSECTS, FERTILISATION BY. *See* **Fertilisation by Insects.**

INTEGERRIMUS. Entire; perfectly free from division of the margin or other part.

INTERNODES. The intervening space between two nodes.

INTERPETIOLAR. Between the petioles.

INTERRUPTED. Not continuous.

INTRORSE. Turned towards the axis to which it appertains; *e.g.*, an anther when its valves face the centre of a flower.

INULA (the old Latin name used by Horace, &c., said to be another form of *Helenion*). ORD. *Compositæ.* A genus comprising about fifty-six species of hardy

Inula—*continued.*

herbaceous plants, natives of Europe, Asia, and Africa—few being found between the tropics. Flower-heads yellow; rays rarely white; involucre hemispherical, imbricated, with the scales spreading at the points; ray-florets

FIG. 316. INULA GLANDULOSA.

numerous, ligulate, linear; disk-florets very numerous, perfect, tubular; receptacle flat, or nearly so, areolate or honeycombed. Leaves radical or alternate, entire or

FIG. 317. INULA HELENIUM.

serrate. Only a few species of this genus are worth growing. They are of very easy culture in common garden soil. Some of the more vigorous are suitable for

Inula—*continued.*

naturalising in the wild garden. Increased readily by divisions, or by seeds.

I. glandulosa (glandular).* *fl.-heads* yellow; scales of involucre lanceolate, villous. July and August. *l.* sessile, oblong, obsoletely serrated; the serratures glandular. Stem hairy, one-headed. *h.* 2ft. Caucasus, 1804. See Fig. 316. (B. M. 1907; B. R. 334.)

I. Helenium (Helenium). Elecampane. *fl.-heads* bright yellow, large, solitary, terminal. Summer. *l.* ovate, serrate, rugose, stem-clasping, downy beneath; root ones stalked. Stem furrowed, branched and downy above. *h.* 3ft. to 4ft. Europe (Britain), Siberia. A strong-growing perennial. Formerly used as an aromatic and tonic; the rootstock is still used in a candied state. See Fig. 317. (B. M. Pl. 150.)

I. Hookeri (Hooker's).* *fl.-heads* faintly sweet-scented, 2½in. to 3½in. in diameter, shortly peduncled, terminating leafy branches; involucre broad, shaggy; ray-florets numerous, with slender pale yellow ligules, which are 1in. or more long, obtusely three-toothed at apex; disk-florets numerous; receptacle convex, papillose; pappus hairs dirty-white. September. *l.* bright green, 3in. to 4in. long, sessile, or narrowed into short petioles, oblong-lanceolate, acuminate, minutely toothed, hairy above, tomentose beneath. Stems sparingly branched. *h.* 1ft. to 2ft. Sikkim Himalayas, 1849. (B. M. 6411.)

I. Oculus Christi (Christ's eye). *fl.-heads* bright golden-yellow, about 3½in. across; involucre very downy. Summer. *l.* broadly lanceolate, obtuse, almost entire, or slightly toothed, rather downy. *h.* 1½ft. to 2ft. Eastern Europe, &c., 1759. A very ornamental perennial, with a neat habit. (J. F. A. 223.)

INVOLUCEL. A small involucre.

INVOLUCRARIA. Now included under **Trichosanthes** (which *see*).

INVOLUCRATE. Having an involucre.

INVOLUCRE, INVOLUCRUM. A ring or rings of bracts which surround several flowers. The term is also used as synonymous with the Indusium of ferns.

INVOLUTE. Rolled inwards.

IOCHROMA (from *ion*, violet, and *chroma*, colour; colour of flowers). SYN. *Chænesthes.* ORD. *Solanaceæ.* A genus containing about fifteen species of greenhouse trees or shrubs, inhabiting Western tropical America. Flowers violet, blue, white, yellowish, or scarlet; calyx tubular, somewhat distended; corolla tubular, much longer than the calyx, and concealing the stamens. Leaves entire, often ample, membranaceous. For culture, *see* **Cestrum.**

I. fuchsioides (Fuchsia-like).* *fl.* drooping, large, handsome; corolla orange-scarlet, thrice as long as the calyx; tube elongated, nearly straight; peduncles shorter than the leaves, single-flowered. Summer. *l.* often fascicled, obovate, inclining to oval or oblong, very obtuse, entire, tapering at base into a short foot-stalk. *h.* 5ft. Quitinian Andes, 1843. A glabrous unarmed shrub. (B. M. 4149, under name of *Lycium fuchsioides.*)

I. grandiflorum (large-flowered). *fl.* rich purple, large; cymes simple, pedunculate, terminal, many-flowered, pendulous; corolla funnel-shaped; tube long, pubescent; throat sub-campanulate; limb large, five-lobed; lobes triangular, recurved. November. *l.* broadly-ovate, acuminate, pubescent above, very pale and subtomentose beneath. Branches terete, pubescent. Ecuador and Peru, previous to 1860. A very handsome shrub. (B. M. 5301.)

I. lanceolata (lanceolate).* *fl.* drooping, in supra-axillary terminal umbels; calyx unequally five-toothed; corolla rich deep purplish-blue, 2in. long, cylindrical, glabrous, dilated at the mouth into a short, five-toothed, spreading limb; pedicels filiform, pendent; stamens and style scarcely exserted. Summer. *l.* alternate, rather large, oval or elliptic-lanceolate, membranous, acute, entire, tapering below into a long petiole, glabrous with age. *h.* 4ft. to 5ft. Andes of Chili, 1847. A beautiful shrub. (B. M. 4338, under name of *Chænestes lanceolata.*)

I. tubulosa (tubular-flowered). *fl.*, corolla blue, showy, tubular, with five short teeth. August. *l.* ovate, three or four times shorter than the corolla. *h.* 5ft. Tropical America, 1843. (B. R. 1845, 20.)

IONE (from *Ione*, one of the Nereids). A genus containing three or four species, now referred to **Bulbophyllum** (which *see* for cultivation).

I. paleacea (scaly).* *fl.* 1in. long, drooping, in many-flowered erect spikes; sepals pale green, red-striped; petals pale yellow-green, small, rounded, erose; lip red-brown, trowel-shaped, as long as the sepals, erose; column short; scape erect, stiff, slender, longer than the leaf. October. *l.* dark green, 6in. to 8in. long, 1in. broad, linear, obtuse, narrowed into a deeply channelled base, but hardly petioled. Pseudo-bulbs dark green, 1in. to 1½in. long, ovoid, smooth. *h.* 9in. Upper Assam, 1877. (B. M. 6344.)

IONIDIUM (from *Ion*, a Violet, and *eidos*, resembling; in allusion to the Violet-like flowers). SYN. *Solea.* ORD. *Violarieæ.* A genus comprising forty species of herbs or sub-shrubs, natives, for the most part, of sub-tropical America. Flowers solitary, having the small unequal sepals running into the peduncle at base; petals unequal, lower ones two or three times longer than the rest, carinately-concave. Leaves alternate, or rarely opposite. The roots of several of the species are of economic value, being used as substitutes for Ipecacuanha. Ionidiums are rarely seen in cultivation. The species described below require greenhouse treatment, and a peat and loam compost. Cuttings of the shrubby sorts will root in sand, under a bell glass. The herbaceous species may be increased by divisions, or by seeds.

I. capense (Cape). *fl.* white; sepals acute, ciliated. Summer. *l.* alternate, obovate, obsoletely-toothed, pubescent. Stems shrubby, erect. *h.* 6in. to 12in. Cape of Good Hope, 1824.

I. Ipecacuanha (Ipecacuanha). *fl.* white; peduncles axillary, solitary, drooping; lower lip very large, emarginate. July. *l.* ovate-oblong. *h.* 1½ft. South America, 1822. The roots of this species furnish what is termed White Ipecacuanha.

I. polygalæfolium (Polygala-leaved). *fl.* greenish-yellow or white; sepals ovate-oblong, acute, pubescent. Summer. *l.* opposite, lanceolate, rather entire. Stems shrubby, branched, diffuse, procumbent. *h.* 1ft. South America, 1797.

IONOPSIDIUM (from *Ion*, a Violet, and *opsis*, appearance; alluding to the resemblance to some of the tufted dwarf-growing Violets). ORD. *Cruciferæ.* A genus comprising two species of small hardy annual herbs, one from Portugal, and the other a native of Sicily and Algeria. Flowers violet, white, or flesh-coloured, small, on long peduncles; sepals spreading, equal at the base; pouch broadly oblong, laterally compressed. Leaves sessile or petiolate, spathulate or orbiculate, entire or three-lobed. *I. acaule*, the species introduced to cultivation, has an extremely neat habit, and rarely exceeds 2in. in height. It thrives on rockwork, and makes an extremely pretty pot plant for window gardening. Seeds may be sown in the open—preferably in pots—any time during spring and summer. This plant should have at all times a shady situation. It often reproduces itself year after year, by self-sowing.

I. acaule (stemless).* *fl.* lilac, or white tinged with violet. Summer and winter. *h.* 2in. to 3in. Portugal, 1845. (B. R. 1846, 51.)

IONOPSIS (from *Ion*, a Violet, and *opsis*, like; flowers resemble a Violet in form). SYNS. *Cybelion* and *Iantha.* ORD. *Orchideæ.* A genus of very pretty little epiphytal stemless orchids, requiring a stove temperature, natives of the West Indies and tropical America from Mexico to Brazil. About ten species have been described, but it is doubtful whether more than two or three are really distinct. Flowers small, panicled; sepals and petals connivent; lip large, fan-shaped, two-lobed at the apex. Leaves few, lanceolate. Pseudo-bulbs small. The only species much seen in cultivation is *I. paniculata.* It is a very difficult plant to grow, and is rarely brought to perfection. It succeeds best on a block, with a little live sphagnum around the roots, which require to be kept moist nearly all the year round. Similar treatment will answer for the other species.

I. paniculata (panicled). *fl.* snow-white or delicate rose-colour, scentless; scape panicled, 1½ft. high; petals obtuse; lip pubescent; lip rotundate, bilobed, much longer than the sepals. *l.* linear-lanceolate, keeled. Brazil, 1865. (B. M. 5541.)

I. tenera (tender). A synonym of *I. utricularioides.*

I. utricularioides (Utricularia-like). *fl.* white, with a pink stain at the base of the lip, racemose; sepals and petals acute, subequal; lip pubescent; limb bilobed, much longer than the sepals. *l.* rigid, acute, furrowed, keeled at the base. Tropical America. SYN. *I. tenera.* (B. R. 1904.)

IOSTEPHANE (from *ion*, violet, and *stephane*, a wreath; in allusion to the violet rays). ORD. *Compositæ.* A genus consisting of only two species of scabrous-pubescent herbs, natives of Mexico. *I. heterophylla* is a very handsome hardy perennial, thriving in any sandy soil. An inverted pot should be placed over the large

Iostephane—*continued.*

tuberous root during severe frosts. Propagation may be effected by division; or by seeds, sown in spring.

I. heterophylla (various-leaved). *fl.-heads* nodding; ray-florets lilac, fifteen to twenty, neuter, many-nerved, adpressedly hairy beneath, obtusely tridentate at apex; disk-florets hermaphrodite, funnel-shaped; receptacle paleaceous, conical; peduncles elongated, one-flowered, densely pilose, simple at apex. Autumn. *l.*, radical ones numerous, spreading, petiolate, oblong, acute; base acuminate; margin serrate; cauline leaves very few, lanceolate; superior ones linear-lanceolate, acuminate, entire, sessile. Stems pubescent, clammy. *h.* 1½ft. 1829. (S. B. F. G. ser. ii., 32, under name of *Echinacea heterophylla.*)

IPECACUANHA. The root of *Cephaëlis Ipecacuanha*, a Brazilian plant, the cultivation of which has been introduced into India. The roots afford the important emetic, and the only known specific for dysentery.

IPOMERIA. Now included under *Gilia.*

IPOMŒA (from *Ips*, Bindweed, and *omoios*, similar, because of the close resemblance of this genus to *Convolvulus*). Including *Batatas*, *Calonyction*, *Exogonium*, *Pharbitis*, and *Quamoclit*. ORD. *Convolvulaceæ.* An extensive genus (over 400 species have been described) of stove or hardy, evergreen or deciduous, twining or creeping herbs, rarely shrubs, widely distributed over all warm climates, with a few species extending into North America. Flowers purple, violet, scarlet, pink, blue, or white, rarely yellow, often showy; corolla salver-shaped, campanulate or tubular; limb spreading, entire or angular. Leaves alternate, entire, lobed, or divided. Some of the stove species of *Ipomæa* are among the prettiest of plants for covering trellises or pillars, particularly over paths, where the beautifully-coloured flowers may be seen to advantage. They are of free growth, and like plenty of root room, such as may be secured by planting in a border inside the house. If this is impracticable, large pots or boxes must be substituted. The hardier kinds succeed in the open air during summer, if forwarded a little in a warm frame, and afterwards planted out in sheltered positions. All the annual species, whether stove or half-hardy, may be readily raised from seed, which should be sown early in spring, in a warm house. A good plan is to place two or three seeds each in small pots, and afterwards transfer the plants bodily into larger sizes. They should be trained on small temporary stakes until established or finally planted out. A suitable compost consists of fibry loam, rotten manure, and leaf soil, which should be mixed together and used somewhat lumpy. Evergreen Ipomœas of perennial duration may be propagated by cuttings of short side shoots, placed in peaty soil, and in a brisk bottom heat; or by layers. The latter method is that best suited for *I. Horsfalliæ*, one of the most beautiful winter-flowering species that does not succeed well from cuttings. *I. Learii* is free-growing, and requires plenty of room; it is one of the best stove species, producing bright blue flowers throughout the autumn.

I. Aitoni (Aiton's). *fl.* pale purple; corolla campanulate; tube thickened; peduncles many-flowered, longer than the petioles. April to October. *l.* cordate, roundish, three-lobed; lobes acute. *h.* 10ft. Stove evergreen twiner. (B. R. [illegible])

I. alatipes (wing-footed). *fl.*, corolla salmon-colour, 3in. in diameter; calyx large, ovate, 1in. or more long; pedicels wingless but very tortuose, frequently [illegible] with glands; peduncles axillary, with a very broad [illegible] wing on each side, two to four-flowered. June. *l.* [illegible] long, cordate, acuminate, with a deep obtuse sinus at the base, and very obtuse rounded lobes, glabrous. Stems and branches also glabrous. Panama, [illegible]. Stove. (B. M. [illegible])

I. albivenia (white-veined). *fl.* pure white, large, solitary, terminating the branchlets; inside of the tube deep purple. August and September. *l.* roundish-cordate, [illegible], the veins elevated, and woolly beneath. Algoa Bay, [illegible]. Stove evergreen twiner. (B. R. 1116.)

I. Batatas (Batatas). This is the correct name of the plant described in this work as *Batatas edulis.*

I. bignonioides (Bignonia-like). This is the correct name of the plant described in this work as *Batatas bignonioides.*

Ipomœa—*continued.*

I. Bona-nox (Good-night).* *fl.* white; corolla undivided; tube very long; peduncles one to three-flowered. July and August. *l.* cordate, entire or angular. *h.* 10ft. Tropical America, 1773. Plant very smooth. Stove twiner. (B. M. 752.)

I. cathartica (cathartic). *fl.* purple; peduncles one to three-flowered. August and September. *l.* cordate or cordately three-lobed. *h.* 10ft. West Indies, [illegible]. Stove evergreen climber. (B. M. 4289, under name of *Pharbitis cathartica.*) There is a deep rose-coloured variety figured in B. R. 999, under name of *Convolvulus pudibundus.*

I. chryseides (golden-flowered). *fl.* yellow, small; peduncles stiff, two to seven-flowered. July to October. *l.* oblong-cordate, sub-hastate, entire or often angular, also three-lobed. Stem twisted. Tropical Asia, Africa, and Australia, 1817. Stove evergreen twiner. (B. R. 270.)

I. crassipes (thick-peduncled). *fl.* purple; sepals very unequal; peduncles one-flowered, bibracteate, thickened above. August. *l.* oblong-lanceolate, entire, acute. *h.* 4ft. South Africa, [illegible]. Greenhouse. (B. M. 4068.)

I. dasysperma (thick-seeded). *fl.* bright sulphur-yellow, with a purplish tube, rather large, numerous; peduncles one to three-flowered. August. *l.* pedate; lobes five to seven, unequal. India, 1815. Stove annual. (B. R. 86, under name of *I. tuberculata.*)

I. ficifolia (Fig-leaved). *fl.* purple; peduncles three-flowered; calyx covered with black hairs. November. *l.* three-lobed; lateral lobes rounded, middle narrower and longer. Buenos Ayres, 18[illegible]. Stove deciduous twiner. (B. R. [illegible])

I. filicaulis (slender-stalked).* *fl.*, corolla white or cream-colour, with a bright purple eye in the throat, scarcely [illegible] broad; peduncle filiform, solitary, mostly bearing two flowers, with slender pedicels, the upper expanding first. July. *l.* [illegible], 2in. to 3in. long, less than [illegible] wide, glabrous, [illegible], acuminate. Stems [illegible], rather than climbing. Tropical regions, 17[illegible]. Stove annual. (B. M. [illegible])

I. Gerrardi (Gerrard's). *fl.* pure white, with a yellow throat, very fragrant, large, numerously produced. *l.* roundish, cordate. Stems [illegible] to [illegible]ft. long. Natal, 18[illegible]. Stove evergreen twiner. (B. M. [illegible])

I. hederacea (Ivy-like).* *fl.* light blue; calyx hairy; peduncles one or two-flowered. July to September. *l.* cordate, three-lobed; lateral lobes acuminate, intermediate acute. *h.* [illegible] Tropical regions, [illegible]. Half-hardy annual. SYN. *I. Nil.* (B. M. 188, under name of *Convolvulus Nil.*) A resin called Pharbitisin, used in medicine, is obtained from the seeds of this plant.

I. h. limbata (white-edged limbed). *fl.*, corolla [illegible] long; tube pale rose-purple; limb deep violet-purple, edged with white, [illegible] in diameter. North Australia, [illegible]. A beautiful [illegible] annual. SYN. *Pharbitis limbata* (under which name it is figured in B. M. 5720).

I. Hookerii (Hooker's). Synonymous with *I. rubro-cærulea.*

I. Horsfalliæ (Mrs. Horsfall's).* *fl.* deep rich glossy [illegible]; peduncles about as long as the petioles, bearing [illegible] cymes of flowers. Winter. *l.* quintately digitate; [illegible]late, quite entire, with undulated margins. West Indies, [illegible]. A showy and handsome stove evergreen twiner. (B. M. [illegible])

I. Jalapa (jalap). *fl.* red, white, or light pink [illegible] long, tubular; tube ventricose above; peduncles [illegible], longer than the petioles. August. *l.* [illegible], entire. South United States, 17[illegible]. A [illegible], tuberous-rooted, evergreen [illegible], the root of which sometimes attains a weight of [illegible]. The true Jalap is *I. Purga.* (B. M. [illegible], under name of *Convolvulus Jalapa.*)

I. Learii (Lear's).* *fl.* [illegible] produced. July to October. Ceylon, [illegible]. A very [illegible] and [illegible] stove evergreen twiner. (B. M. [illegible], under name of *Pharbitis Learii.*)

I. muricata [illegible] on the back; peduncles axillary, one-flowered. June and July. *l.* [illegible] South America, [illegible]. (B. M. [illegible])

I. mutabilis [illegible]. *fl.* blue, large, numerous, cymosely [illegible] of the peduncles. May to September. *l.* [illegible] entire or three-lobed, acuminated, hairy above, tomentose beneath. South America, 1812. Stove evergreen [illegible]. (B. R. [illegible])

I. Nationis (Nation's). *fl.*, calyx ⅓in. long, [illegible]; corolla hypocrateriform; tube cy[illegible], pubescent, 2in. to 2½in. long, and as [illegible]; limb rich orange-scarlet, spreading [illegible] in diameter, five-lobed; peduncles solitary, [illegible] three-flowered. Summer. *l.* membranous, [illegible] entire, 3in. to 5in. long; petiole 2in. to 4in. [illegible] slender, branched, glabrous. Peru, 1863. Greenhouse [illegible]. (B. M. 5432, under name of *Quamoclit Nationis.*)

I. Nil (Nil was the name first used by the Arab [illegible] for this plant). A synonym of *I. hederacea.*

I. pandurata (lyre-shaped).* *fl.* white, with a purple throat, large; peduncles many-flowered. June. *l.* cordate, acuminated,

Ipomœa—*continued.*

rather downy beneath. United States, &c., 1776. Hardy perennial twiner. (B. M. 1939, under name of *Convolvulus panduratus*; B. M. 1603, under name of *C. candicans*.)

I. platensis (Plata). *fl.* violet; calyx very smooth; peduncles one-flowered, shorter than the leaves. June to September. *l.* palmate. *h.* 10ft. South America, 1817. Stove evergreen twiner. (B. R. 333.)

I. pulchella (neat). *fl.* purple; lobes of corolla emarginate, plicate; peduncles twisted, one to three-flowered. December and January. *l.* quinate; leaflets petiolate, elliptic, acuminate. *h.* 10ft. Ceylon. Stove evergreen twiner. (B. M. 4305.)

I. Purga (purge).* True Jalap Plant. *fl.* purplish-rose; corolla limb broad and flat; peduncles generally one-flowered, longer than the petioles. Autumn. *l.* sagitto-cordate, acuminate, glabrous. Xalapa, 1838. Stove evergreen twiner. SYN. *Exogonium Purga* (under which name it is figured in B. R. xxxiii. 49).

FIG. 318. IPOMŒA PURPUREA, showing Habit and detached Flowering Shoot.

I. purpurea (purple).* *fl.* dark purple; calyx hispid; peduncles many-flowered. June to September. *l.* cordate, undivided. *h.* 10ft. Tropical America, 1629. See Fig. 318. This hardy annual is the well-known and deservedly popular *Convolvulus major* of seed catalogues. SYN. *Convolvulus purpurea* (B. M. 113). *I. p. incarnata* (B. M. 1682) and *I. p. varia* (B. M. 1005) are two varieties of this species.

FIG. 319. IPOMŒA QUAMOCLIT, showing Habit and detached Flowering Branchlet.

I. Quamoclit (Quamoclit).* *fl.* dark red; peduncles one-flowered. July to September. *l.* pinnate; pinnæ filiform. *h.* 6ft. Tropical America, 1629. Stove twining annual. See Fig. 319. (B. M. 244.)

I. rubro-cærulea (reddish-blue).* *fl.* white in the bud, with the limb of a rich lake-red, which, when the flower is fully expanded, becomes of a fine purplish-blue; peduncles three or four-flowered, thickened and somewhat racemose. July and August. *l.* on long petioles, deeply cordate, acuminated. South Mexico, 1830. Stove evergreen twiner. SYN. *I. Hookerii*. See Fig. 320. (B. M. 3297.)

I. setosa (bristly). *fl.* purplish-red, salver-shaped; peduncles robust, many-flowered, trichotomously cymose. August to October. *l.* naked, cordate, three-lobed; lobes dentately sinuated. Branches, petioles, and peduncles hispid from bristles. Brazil. Stove deciduous twiner. (B. R. 335.)

FIG. 320. IPOMŒA RUBRO-CÆRULEA, showing Habit and detached Flowering Shoot.

I. sinuata (sinuated). *fl.* white, with a reddish throat; peduncles one-flowered, longer than the leaves. June to September. *l.* deeply seven-parted; segments sinuated or pinnatifid. Stem, petioles, and peduncles very pilose. Tropical America, 1813. Greenhouse evergreen twiner. See Fig. 321.

FIG. 321. LEAF OF IPOMŒA SINUATA.

I. Tweediei (Tweedie's). *fl.* purple; corolla with elongated tube; sepals ovate, acute, unequal; peduncles one or two-flowered. June and July. *l.* cordate, acute, entire. *h.* 6ft. Panama, 1838. Stove evergreen twiner. (B. M. 3978.)

I. tyrianthina (tyrianthine). *fl.* dark purple; calyx villous; peduncles many-flowered. August to November. *l.* roundish-cordate, acuminate, villous. Stems fruticose, warted. *h.* 10ft. Mexico, 1838. Greenhouse deciduous twiner. SYN. *Pharbitis tyrianthina* (under which name it is figured in B. M. 4024).

I. versicolor (various-coloured). *fl.* bright rosy-crimson at first, changing as they expand, first to orange and then to pale yellow, disposed in scorpioidal racemes; corolla limb salver-shaped, with a swollen tube. June. *l.* cordate at the base, three-lobed. South Mexico, 1841. (B. R. 1842, 24, under name of *Mina lobata*.)

IPOMOPSIS. This genus is now included under **Gilia** (which *see*).

IPSEA. Now included under **Pachystoma** (which *see*).

IRESINE (from *eiros*, wool; referring to the woolly aspect of the branches). ORD. *Amarantaceæ*. A genus of about eighteen species of erect herbs or sub-shrubs, natives of tropical and sub-tropical America. Flowers white or greenish, inconspicuous, with three bracts. Leaves opposite, petiolate, very ornamental in the cultivated sorts. Iresines are indispensable plants in all bedding-out arrangements, on account of their beautifully-coloured foliage. They are easily propagated in spring for this purpose, by inserting in a close pit or propagating frame. The best plan for securing and preserving healthy stock plants is, to insert a quantity of cuttings

Iresine—*continued.*

in 5in. pots in August, and place them in any close frame. They soon root, and the plants thus obtained should be kept rather dry throughout the winter, and in a temperature of about 55deg. An increase of heat and moisture, about March, will cause the production of strong cuttings. Iresines are rather tender; consequently, they should not be planted out before the beginning of June, except in warm localities where there is no danger from late spring frosts. A warm season is best for bringing the foliage to perfection, particularly that of *I. Herbstii.* *I. Lindenii* is one of the most distinct sorts, and an invaluable bedding plant.

Greenfly and Red Spider are troublesome insects, especially in winter and spring, when the plants are indoors. The former may be destroyed by fumigation; and frequent syringings will greatly tend to prevent Red Spider from becoming established.

I. Herbstii (Herbst's).* *l.* opposite, somewhat cordate, deeply two-lobed at the apex, and concave; upper surface dark maroon; midrib and primary veins broadly margined with carmine; under side deep crimson. Stem and branches bright carmine, almost transparent. *h.* 12in. to 18in. South Brazil, 1864. SYN. *Achyranthes Verschaffeltii.* (B. M. 5499.)

I. H. acuminata (acuminated). A handsome form, with sharply acuminated leaves. (F. M. 441.)

FIG. 322. IRESINE HERBSTII AUREO-RETICULATA, showing Habit and detached Portion of Inflorescence with Leaf.

I. H. aureo-reticulata (golden-netted).* This variety has deep vinous-red stems, leafstalks, and principal veins; the surface of the leaves being green, blotched with gold. See Fig. 322. (F. M. 333.)

I. Lindenii (Linden's).* *l.* narrow, oblong-lanceolate, rich deep blood-red, with a central band of amaranth. Ecuador, 1868. A very handsome and compact-growing plant.

IRIARTEA (named in honour of Juan Iriarte, a Spanish botanist). SYN. *Deckeria.* ORD. *Palmeæ.* This genus contains about five species of stove palms, rarely seen in cultivation, and rather difficult to grow. According to Mr. Williams, Iriarteas should be potted in a compost of nearly all sand and loam, and plunged in a tank of water, without which they are not likely to succeed. Propagated by imported seeds.

I. deltoidea (deltoid).* *l.* pinnate; pinnæ about 2in. broad, sessile, erose at the apex; apical segments much the largest, 6in. to 12in. long, and nearly as much in breadth. Plant spineless. Peru. An elegant species. SYN. *I. robusta.*

I. exorhiza. *See* **Socratea exorhiza.**

I. præmorsa (bitten off). *See* **Catoblastus præmorsus.**

I. robusta (robust). A synonym of *I. deltoidea.*

IRIDEÆ. A natural order of monocotyledonous plants. Perennial herbs. Flowers regular or irregular, terminal, in a spike, corymb, or loose panicle, rarely solitary, each furnished with two (rarely more) spathaceous bracts, usually scarious; perianth superior, petaloid, tubular, six-fid, regular or sub-bilabiate; stamens three, inserted at the base of the outer row of the perianth; anthers innate,

Irideæ—*continued.*

opening on the back. Leaves usually all radical, equitant, distichous, ensiform or linear, angular, entire, flat, or folded longitudinally, the cauline ones alternate, sheathing. Irideæ inhabit both warm and temperate regions, and abound at the Cape of Good Hope. They possess fragrant, stimulant, and acrid properties. Illustrative genera are: *Crocus, Gladiolus, Iris, Ixia.*

IRIS (the Greek name for the rainbow, used as a title of this plant since the time of Hippocrates). Including *Evansia, Gynandriris, Hermodactylon, Oncocyclus, Xiphion,* &c. ORD. *Irideæ.* A genus of about a hundred species of mostly hardy herbaceous plants with creeping or tuberous rootstocks, natives of Northern temperate regions. Flowers in sheaths; perianth six-cleft; segments in two rows; three outer ones reflexed, often bearded at the base; three inner ones erect, usually smaller than the others; perianth tube short; stamens three, inserted at the base of the outer row of the perianth; anthers innate; style with three petal-like divisions. Capsule leathery, trigonous, dehiscing loculicidally. Leaves chiefly radical, equitant, sword-shaped or linear.

The numerous species and varieties of *Iris,* now in cultivation, comprise a large and most interesting group of hardy plants, remarkable alike for their curiously-constructed and quaintly-marked flowers, and for the peculiar manner in which many beautiful colours are blended in them. A large proportion of the commoner species do not need more than ordinary attention to secure a profusion of flowers annually; but there are several which require special treatment, and can then rarely be induced to flower. These are, however, well deserving of special attention, on account of the beautiful markings and combination of colours the limited number of flowers they bear more particularly exhibit. There are two large and distinct sections into which the Iris is usually divided according to its habit of growth, and these are distinguished by the one having long bulb-like corms, and the other creeping fleshy root-stocks or rhizomes. For convenience, they may be termed the bulbous and rhizomatous sections, and a reference made to each separately, as the proper treatment varies somewhat considerably with several of the species. The flowering season of the Iris is principally spring and early summer; but, with an assortment of the numerous species and varieties in each section, it may be prolonged throughout almost the whole year. Height in the plants varies from 2in. or 3in. in some species, to 3ft. or 4ft. in others; and a great diversity of habit is also represented.

Propagation. The plants belonging to the bulbous section of *Iris* may be raised in quantities from seed if desired. It is produced by many in both sections, if allowed, and should be sown in sandy soil, so soon as ripe, preferably in pans or boxes, which may be placed

FIG. 323. DEHISCING CAPSULE OF IRIS.

in a cold frame. Fig. 323 shows the way in which the seed capsule bursts, when ripe, for discharging its con-

Iris—*continued.*

tents. The seeds germinate the following spring, and bulbs, sufficiently large for flowering, may be expected after three years' growth. Quantities of offsets may also be utilised for propagating purposes; but care should be taken not to injure the old bulb in removing them, or allow it to be kept too long exposed to the air. The rhizomatous section may be propagated by division; or by layering, if roots are not readily emitted in the ordinary way.

Cultivation. The bulbous section, or Xiphions, are principally represented in gardens by what are known as English and Spanish Iris. Both are of Spanish origin, and vary chiefly in the size of the bulbs and flowers, and in the more curious combination of colours, as exhibited in the flowers of the former. *I. filifolia*, *I. Histrio*, *I. persica*, and *I. reticulata*, are very beautiful, and early flowering species, also of this section. They all succeed best in a light, rich, sandy soil, and in a situation fully exposed to sun, yet protected, if possible, from easterly or other strong winds. Efficient drainage in autumn and winter are important conditions, and the bulbs should not be removed from the soil more than is really necessary. Bulbous Iris are most attractive when planted in masses.

Of the rhizomatous species there are large numbers, which may be grouped according as their cultivation requires. The bearded, more commonly called the German Irises, comprise a number of varieties, having large and very handsome flowers; and, as they are among the easiest to cultivate, they are largely grown. Their rhizomes (see

FIG. 324. SURFACE RHIZOMES OF GERMAN IRIS.

Fig. 324) are formed on the top of the ground, and should not be covered with soil, or they will be liable to rot in winter. Dwarf-growing species, like *alata*, *aphylla*, *biflora*, *Chamæiris* and its varieties, *pumila* with its varieties, and *rubro-marginata*, should be provided with a sunny position on a rockery, and be planted in light, rich soil. *flavescens*, *florentina*, *germanica*, *lutescens*, *sambucina*, and *squalens*, are a few of the stronger-growing bearded Iris, that are not so particular regarding the soil or situation wherein they are planted.

The beardless Irises comprise a large group, and their cultivation varies considerably with different species. Some do best in heavy loam, others in peat and loam, and others again in nearly all peat, formed into a sort of semi-bog, by the insertion of 3in. of clay beneath it. Some of the species which succeed with this latter preparation are: *fulva*, *hexagona*, *lævigata*, *pseudacorus*, *setosa*, *sibirica* and its varieties, and *versicolor virginica*. Examples of beardless Iris which succeed in loam, or loam and peat, are: *aurea*, *graminea*, *Guldenstädtiana*, *humilis*, *Monnieri*, *ochroleuca*, and *spuria*.

I. iberica and *I. susiana* are two of the most singular and beautiful species, belonging to a separate group or sub-genus. They are amongst the most difficult of plants to flower, and require special treatment, apart from any of the others. A frame, and light, rich soil, should be provided for their accommodation, and they should be dried off, and allowed the fullest exposure to the sun from the time flowering is over, until spring of the following year. Plenty of river sand round the rhizomes tends to keep them dry in winter—an important point in the cultivation—and also assists in effecting perfect drainage at all times. All varieties of *Iris* are impatient of root disturbance, their flowering being much hindered thereby. Plants that are established increase in size rapidly, and flower with much more certainty if allowed to remain undisturbed. They like plenty of sun and air, but should be protected, if practicable, from east and northerly winds.

In the subjoined list, the Synopsis of Mr. J. G. Baker, which appeared in the columns of the *Gardeners' Chronicle*, has been followed.

Sect. I. Irises proper.

I. amœna (pleasing). A synonym of *I. hybrida*.

I. aphylla (leafless). *fl.* scentless; limb dark lilac, 2½in. deep; falls obovate, ¾in. to ¼in. broad, reflexing half-way down, cuneately narrowed to a long claw; beard white; standards erect, a little broader than the falls, suddenly narrowed into a long claw; claws white, veined with lilac. May. *l.* not more than two produced to a tuft, glaucous-green, ensiform, falcate. Stems forked low down, or two or even three produced from the same tuft. *h.* 1ft. Eastern Europe and Western Asia. (B. M. 2361; B. R. 801, under name of *I. furcata*.)

I. arenaria (sand-loving). *fl.* bright yellow, striped with purplish-brown on the claws; falls oblong-spathulate, with a bright yellow beard reaching half-way up; standards rather shorter, and narrow; scape slender, erect, one or two-flowered. May. *l.* tufted, few, linear. Rhizome much-branched. *h.* 3in. to 4in. Hungary to European Russia, 1802. This plant is well adapted for rockery or pot culture, but is not common in English gardens. (B. R. 549.)

I. aurea (golden).* *fl.* bright yellow; falls oblong, crisped at the edge; standards oblanceolate, shorter than the falls. June. *l.* ensiform, about 2ft. long. Stem stout, bearing two sessile clusters of flowers. *h.* 3ft. to 4ft. Western Himalayas. (B. R. xxxiii. 59.)

I. balkana (Balkan).* *fl.* bright lilac-purple; tube 1¼in. long; limb 3in. long; falls 1¼in., and standards 1½in. broad; spathe valves green, acute. April. Stem as long as the leaves. *h.* 1ft. Northern Thrace, 1878. Mr. Baker regards this as a variety of *I. Chamæiris*; it is a very fine plant.

I. biflora (two-flowered).* *fl.* bright violet-purple; limb 2in. to 2½in. deep; falls obovate, 1in. broad, reflexing half-way down, the yellow beard over 1in. long; standards erect, over 1in. broad; spathe two-flowered. April. *l.* ensiform, rather glaucous. Rhizome stout, short-creeping. South Europe, 1596. SYNS. *I. fragrans*, *I. nudicaulis* (under which name it is figured in B. M. 5806), *I. subbiflora*.

I. biglumis (two-plumed). A synonym of *I. ensata*.

I. Bloudovii (Bloudow's). *fl.* light yellow; limb almost 2in. long; outer segments obovate-cuneate, nearly or quite 1in. broad, reflexing half-way down, the bright yellow beard running more than half-way up; standards erect, as broad as the falls, but somewhat shorter; spathe two-flowered. May. *l.* linear, thin. *h.* 6in. to 12in. Altai Mountains. (R. G. 1020.)

I. brachycuspis (short-pointed). A synonym of *I. setosa*.

I. Chamæiris (dwarf Iris).* *fl.* solitary; limb 2in. deep; falls oblong-spathulate, ¾in. broad, bright yellow, tinged and veined with brown; beard bright orange-yellow; standards erect or converging, oblong-unguiculate, 1in. broad, crisped at the edge, primrose-yellow. April. *l.* four to six in a tuft, ⅜in. to ½in. broad, pale green. *h.* 4in. to 6in. South Europe.

I. C. olbiensis (Olban). *fl.*, limb deep lilac purple, 2in. long; falls 1in. broad; claw white, veined with purple; beard white, tipped with yellow; standards obovate-unguiculate, a little broader than the falls. April. Stem 4in. to 6in. long, clasped by a sheathing leaf a little above the base. South of France. (B. M. 6110.)

I. chinensis (Chinese). A synonym of *I. japonica*.

I. cretensis (Cretan).* *fl.*, limb lilac, 2in. deep; falls obovate-unguiculate, beardless, ¾in. broad; the reflexing lamina much shorter than the narrow claw; standards oblanceolate-unguiculate, ¼in. broad. April and May. *l.* in dense tufts, narrow-linear, erect, firm, and stout in texture, acuminate, closely and distinctly ribbed. Stem none, so that the spathe is sessile in the centre of the cluster of leaves. Greece, Asia Minor, Crete, and the Ionian Islands. (B. M. 6343.)

I. cristata (crested).* *fl.*, limb pale lilac, about ½in. deep; falls with an obovate-obtuse reflexing blade, ½in. broad, the throat and

Iris—*continued.*

crest deep yellow; standards erect, oblanceolate, less than ½in. broad, and rather shorter than the falls. April and May. *l.* about four, in a distichous rosette, linear, broad at the middle. Stem very short, two-flowered. *h.* 6in. Eastern United States, 1756. (B. M. 412; L. B. C. 1366.)

I. dichotoma (two-forked). *fl.*, limb lilac, about 1in. deep, not opening till afternoon, and only expanding once, twisted spirally after flowering; falls oblong, ½in. broad, the claws obscurely bearded, white, spotted with purple; standards oblanceolate, deeply emarginate; clusters five or six-flowered. July. *l.* in an erect, distichous cluster, ensiform. Stem 2ft. to 3ft. high, slender, corymbosely branched. Davuria and North China, 1784. A very distinct species. (B. R. 246; S. B. F. G. 96.)

I. Douglasiana (Douglas').* *fl.*, limb bright lilac-purple, 1½in. to 2in. deep; falls obovate-spathulate, with a reflexing lamina ½in. to ¾in. broad, as long as the claw; standards rather shorter, oblanceolate-unguiculate, erect. June. *l.* about four in a tuft, linear, thick, rigid, strongly ribbed. Stems 6in. to 12in. high, slender, having one or two clusters of flowers. California, 1873. (B. M. 6083.)

I. ensata (sword-shape-leaved). *fl.*, limb lilac-purple, about 2in. deep; divisions all oblanceolate; falls with a reflexing blade, marked with yellow, and veined at the throat; standards erect, lilac, ½in. broad; cluster single, terminal, one to three-flowered. June and July. *l.* tufted, linear, glaucous, firm. Stem firm, about 1ft. high. Temperate Asia. A rare but handsome species. SYNS. *I. biglumis*, *I. fragrans* (B. R. xxvi. 1), *I. longispatha* (B. M. 2528), *I. Pallasii* (B. M. 2331).

FIG. 325. IRIS GERMANICA, showing Habit and detached Flower.

I. flavescens (yellowish).* *fl.* lemon-yellow; limb about 2in. deep; falls obovate-cuneate, about 1½in. broad, reflexing half-way down; claw veined with purplish-brown; beard orange-yellow; standards erect, obovate, rather shorter and broader than the falls; clusters terminal, three or four-flowered. May. *l.* few, tufted, ensiform, 1ft. to 1½ft. long. Stem 2ft. to 3ft. high, glaucous, branched about half-way down. Eastern Europe and Western Asia, 1818. (S. B. F. G. ser. ii. 56; B. R. 1845, 35, under name of *I. imbricata.*)

I. florentina (Florentine).* *fl.* fragrant; limb 3in. to 3½in. deep; both rows of segments eighteen to twenty-one lines broad; falls obovate-cuneate, white, tinged with lavender, reflexing half-way down; claw veined with green and brown; beard bright yellow; standards erect, obovate-oblong, with a short claw, pure white. May. *l.* few, tufted, ensiform, glaucous. Stems 2ft. to 3ft. high, branched above the middle, bearing three or four terminal spathes. South Europe, 1596. The rhizome of this possesses cathartic and emetic properties; it is also used as the basis of many perfumery powders. (B. M. 671; B. M. Pl. 273.)

I. fœtidissima (very fœtid).* Stinking Gladwin. *fl.*, limb bluish-lilac, 2in. deep; falls obovate-unguiculate, the oblong-obtuse lamina ¾in. broad; standards erect, oblanceolate, three to four lines broad, shorter than the falls; clusters sessile, lateral. June. *l.* ensiform, same length as stem, firm. Stem compressed, 2ft. to 3ft. high. West Europe (Britain). A very desirable species, of easy cultivation in almost any situation, but it prefers and flourishes best in a moist one. Its large, thrice-divided seed pods, showing the large, orange-coloured seeds, are very ornamental. (Sy. En. B. 1494.)

Iris—*continued.*

I. fragrans (fragrant), of Lindley. A synonym of *I. ensata.*

I. fragrans (fragrant), of Salisbury. A synonym of *I. biflora.*

I. fulva (tawny).* *fl.*, limb bright fulvous-brown, 2in. to 2½in. deep; all the segments reflexing equally when expanded; falls oblong-unguiculate, ¾in. to 1in. broad, obtusely rounded at the top, deeply emarginate, gradually narrowed into a claw not more than ½in. long, velvety on the face, with reddish-brown pubescence on the keel; standards shorter, oblanceolate-spathulate, 1½in. long, ½in. to ¾in. broad. June. *l.* narrow-ensiform, bright green. Stems 2ft. to 3ft. high, forked low down, angular in the lower part, furnished at the forks with large leaves. United States. (B. M. 1496.)

I. germanica (German).* German or common Iris. *fl.* fragrant; limb 2½in. to 3in. deep; falls obovate-cuneate, 1½in. to 2in. broad, bright purple, reflexing half-way down; claw white with brownish veins; beard bright yellow; standards obovate-unguiculate, deep lilac, erect; clusters four or five-flowered. May. *l.* tufted, few, ensiform, very glaucous. Stem 2ft. to 3ft. high, glaucous, forked half-way down. Central and South Europe. A fine ornamental species, and one of the commonest in cultivation; it has numerous very elegant varieties. See Fig. 325. (B. M. 670; B. R. 818, under name of *I. nepalensis*).

I. gigantea (gigantic). A garden name of *I. ochroleuca.*

I. graminea (grass-leaved).* *fl.* slightly fragrant; limb bright lilac-purple, 1½in. to 2in. deep; falls with an orbicular limb, ½in. broad; claw dull yellow; throat veined with blue-purple on a white ground; standards erect, purple, ¼in. broad; clusters terminal, two or three-flowered. May. *l.* about four, tufted, linear, much overtopping the flowers. Stem solid, ancipitous, about 9in. high. Central and Southern Europe, 1597. (B. M. 681.)

FIG. 326. IRIS GULDENSTÄDTIANA.

I. Guldenstadtiana (Guldenstadt's).* *fl.*, limb 2in. deep; claws of the falls much longer than the obovate deflexed lamina, which is pure white, ¾in. broad, with an orange throat; standards oblanceolate, ½-in. broad, erect, rather shorter than the falls, pure white, with a yellow keel and border; spathes two or three-flowered. June. *l.* firm, ensiform. Stems stout, 2ft. high. Siberia, 1757. This species is, according to Mr. Baker, the *erratica* and *Wittmaniana* of many gardens. SYNS. *I. halophila* (of Pallas, but not of B. M. 875, which is *I. spuria notha*), *I. stenogyne.* See Fig. 326.

I. halophila (salt-loving). A synonym of *I. Guldenstadtiana.*

I. hexagona (hexagonal). *fl.*, tube funnel-shaped, ¾in. to 1in. long, pale or deep lilac, 3in. to 3½in. deep; falls obovate-unguiculate, the lamina exceeding the claw, 1in. to 1½in. broad; standards erect, oblanceolate-spathulate, ½in. broad, rather shorter than the falls; spathe valves often 5in. to 6in. long April. *l.*, basal ones ensiform, 2ft. to 3ft. long, by 1in. to 1½in. broad. Stems 3ft. to 4ft. high, deeply forked, and furnished with several large leaves. Southern United States. (B. M. 6787.)

Iris—*continued.*

I. humilis (low). *fl.*, limb bright lilac, 1½in. to 2in. deep; falls oblong-spathulate, beardless; claw exceeding the blade; standards rather shorter, oblanceolate-unguiculate, erect; spathe sessile in the centre of the cluster of leaves, one-flowered. *l.* about a dozen, in a basal rosette, linear, glaucous, ribbed. Stem none. Southern Russia, Siberia, &c.

I. hybrida (hybrid).* *fl.*, limb 2in. to 2½in. deep; falls obovate-cuneate, 1¼in. to 1½in. broad, reflexing half-way down, plain, deep lilac-purple at the tip, copiously veined lower down with the same colour on a pure white ground; beard yellow; standards the same breadth, erect, obovate-unguiculate, pure white, or slightly tinged with lilac. June. *l.* about 1ft. long, 1in. to 1¼in. broad, purple at the base. Stem forked low down, with three or four terminal spathes. A handsome garden race of unknown origin—according to Mr. Baker, probably derived from *I. squalens*. SYN. *I. amœna*. There are a number of desirable varieties.

FIG. 327. FLOWER OF IRIS IBERICA.

I. iberica (Iberian).* *fl.* solitary; limb 3in. deep; segments nearly equal, ovate, obtuse, cuneately narrowed to a short claw, 1½in. to 2in. broad; falls reflexing from near the base, closely veined like those of *I. susiana* with dark purplish-brown, with a velvety, plain, dark purple blotch at the throat; standards erect, veinless, white or pale lilac. Summer. *l.* few, in a basal tuft, falcate, glaucous, linear. Stem 3in. to 6in. high. Caucasus. See Fig. 327. (R. G. 386; 1, 2.)

I. i. insignis (remarkable).* A very striking and handsome variety, with larger flowers, and a dwarfer habit than the typical species; falls white, veined with black lines, densely spotted and blotched with reddish-brown; standards lilac-white, veined and thickly spotted throughout with a deeper tint of the same hue. This variety should be planted in the hottest and driest part of the garden, and be fully exposed to the sun.

I. japonica (Japanese). *fl.*, limb lilac, 1in. to 1½in. deep, division spreading falcately; falls oblong-spathulate, ½in. broad, crisped, and irregularly fimbriated at the edge, spotted with yellow and white at the centre, and furnished with a fimbriated petaloid crest reaching two-thirds of the way up; standards plain lilac, rather narrowed. April and May. *l.* in a fan-like tuft, ensiform, bright green. Stem 1ft. to 1½ft. high, of which the upper half or two-thirds is occupied by a lax panicle with erecto-patent branches. Japan and China. SYN. *I. chinensis* (under which name it is figured in B. M. 373, 1797).

I. Kæmpferi (Kæmpfer's). A synonym of *I. lævigata*.

I. Korolkowi (Korolkow's). *fl.*, limb 2½in. deep, groundwork white tinged with brown, marked with copious dark brown veins, radiating from the throat; blade of the falls oblong, 1½in. long, 1in. broad; claw bearded; standards rather broader, oblong-unguiculate, erect. *l.* linear, glaucous, as long as the stem. Stem 1ft. to 1½ft. high, leafy in the lower part, ending in a solitary, two-flowered, terminal spathe. Turkestan, 1874. (R. G. 766.)

I. lævigata (smooth).* Japanese Iris. *fl.* solitary; limb deep bright purple, 3in. to 3½in. long; falls obovate-unguiculate, reflexing from low down, with a bright yellow blotch at the throat; standards oblanceolate-spathulate, purple, 2in. long, ½in. broad. June. *l.* narrow-ensiform, pale green, thin, weak. Stem 1½ft. to 2ft. high firm, solid, glaucous. Siberia and Japan. A handsome species, and one of the best of the genus. SYN. *I. Kæmpferi*, under which name it is most generally known. This is cultivated by the Japanese as a sub-aquatic, and in England it thrives best when copiously supplied with water during the growing season. It succeeds admirably when cultivated in pans,

Iris—*continued.*

and the bottoms of these placed a depth of a couple of inches in a tank of water. (R. G. 442, 1; B. M. 6132.) There are a great number of exceedingly beautiful varieties of this species in cultivation, many of which produce flowers measuring quite 10in. across. There are also several desirable double forms, one of which, *flore-pleno*, is illustrated at Fig. 328.

FIG. 328. IRIS LÆVIGATA FLORE-PLENO.

I. longipetala (long-petaled). *fl.* in a single terminal head; limb bright lilac, 2½in. to 3in. deep; falls obovate, unguiculate, reflexing half-way down; lamina obovate, 1in. to 1¼in. broad, cuneately narrowed into the short claw, which has a bright yellow keel and violet veins on a pure white ground; standards erect, oblanceolate-spathulate, 2in. long, ½in. broad. Summer. *l.* firm, narrow-ensiform, 1ft. to 1½ft. long. Stems 2ft. to 3ft. high, solid, compressed. California, 1862. (B. M. 5298.)

I. longispatha (long-spathed). A synonym of *I. ensata*.

I. lurida (dingy). *fl.*, limb 2½in. deep; falls oblong, 1in. broad, reflexing half way down, cuneately narrowed to the base, having the upper part plain dead purple, and the lower half veined with dead purple on a yellow groundwork; beard bright yellow; standards rather broader, with a crisped, veinless, dull purple blade and veined yellow claw; spathes one or two-flowered. April. *l.* ensiform, slightly glaucous. Stems deeply forked, about 2ft. high. Eastern Europe, 1758. Closely allied to *I. variegata*, but inferior as a decorative plant. (B. M. 986.)

I. lutescens (yellowish).* *fl.* 2½in. deep; falls pale yellow, tinged and veined with purplish-brown, oblong, nearly or quite 1in. broad, with a reflexing blade as long as the claw; beard bright yellow; standards broader, erect, primrose-yellow, narrowed suddenly to the claw. May. *l.* ensiform, slightly glaucous. Stem terete, glaucous, unbranched. South Europe. (B. M. 2861.)

I. missouriensis (Missouri). *fl.*, perianth tube funnel-shaped, ¼in. to ⅓in. long; outer segments of limb 2in. to 2½in. long, veined with lilac-purple on pale groundwork, and faintly keeled with yellow towards base of limb; inner segments nearly as long as the outer, plain lilac purple. May. *l.*, produced ones about four to a tuft, linear, not more than 1ft. long, ¼in. to ½in. broad, narrowed gradually to the point, firm in texture. Stem bearing a single cluster of two or three flowers. Rocky Mountains, 1880. (B. M. 6579.)

I. Monnieri (Monnier's).* *fl.* fragrant, clustered; limb bright lemon-yellow, 3in. to 3½in. deep; falls roundish, eighteen to

Iris—*continued.*

twenty lines broad, equalling the claw; standards spreading, oblanceolate-spathulate, 3in. long, 1in. broad; spathes two-flowered. June and July. *l.* firm, sub-erect, lanceolate, about 2ft. long. Stems stout, terete, 3ft. to 4ft. high. Crete.

I. neglecta (neglected).* *fl.*, limb 2in. deep; falls bright lilac, obovate-cuneate, 1in. to 1¼in. broad, much striped on a pure white ground; beard bright yellow; standards obovate-unguiculate, 1¼in. broad, bright light unstriped lilac. June. *l.* ensiform, slightly glaucous, purple at the base, 1ft. to 1¼ft. long. Stem 1½ft. to 2ft. high, branched above the middle. A very common form, the native country of which is unknown. It is the handsomest species of the *germanica* group. (B. M. 2435.) About a score named varieties are catalogued by some growers.

I. nepalensis (Nepaul). *fl.*, limb lilac, 1½in. to 2in. deep; falls with a reflexing oblong blade as long as the claw, furnished with a yellow crest down the lower two-thirds of the keel; standards oblanceolate, unguiculate, erect, rather shorter than the falls. *l.* linear, moderately firm in texture, with several strong ribs, and narrowed gradually to an acuminate point. Stem 6in. to 1ft., with one to three clusters of flowers. Himalayas, 1828. (S. B. F. G. ser. ii. 11.) The plant figured in B. R. 818 is not *I. nepalensis*, but *I. germanica*.

I. nudicaulis (naked-stemmed). A synonym of *I. biflora*.

I. ochroleuca (yellowish-white).* *fl.* clustered; limb 3in. to 3½in. deep, the round-obovate, suddenly-reflexed blade eighteen to twenty-one lines broad, pure white at the edge, bright orange-yellow at the base, as long as the claw, which is yellow on the face, without veins, and green on the back; standards erect, oblanceolate, rather shorter than the falls. June. *l.* firm, ensiform, 1in. broad. Stem 3ft. high, stout, terete. Native country uncertain. (B. M. 61; R. H. 1875, 357, under name of *I. gigantea.*)

I. orientalis (Eastern). This species closely resembles *I. sibirica*, but differs from it by the redness of its young leaves, shorter peduncles, more tender leaves and spathe valves, and more fugitive flowers. Japan and the East of Siberia. (B. M. 1604, under name of *I. sibirica sanguinea.*)

I. Pallasii (Pallas'). A synonym of *I. ensata*.

FIG. 329. FLOWER SCAPE OF IRIS PALLIDA.

I. pallida (pale). *fl.* with an Orange-blossom-like fragrance; limb 2in. to 2½in. deep, varying from a bright slaty lilac to a deep lilac-purple; falls 1½in. to 2in. broad, reflexing half way down, veined in the lower half with bright lilac on a white ground; beard bright yellow; standards as broad as the falls, somewhat crisped, obovate. June. *l.* few, tufted, ensiform, 12in. to 18in. long. Stems 2ft. to 3ft. high. Mediterranean region, 1596. A fine species, with many very desirable varieties. See Fig. 329. (B. M. 685.)

Iris—*continued.*

I. plicata (plicate). *fl.* fragrant; limb 2½in. deep; falls 1½in. broad, obovate, cuneately narrowed from the middle to the base, pure white in the centre, veined with bright lilac round the edge and on the claw; beard tipped with yellow; standards 1½in. broad, obovate-oblong, very plicate, pure white in the centre, lilac round the border. July. *l.* slightly glaucous, 12in. to 18in. long, 1in. to 1½in. broad. Stem 2ft. to 3ft. high, sub-terete, bearing four to six clusters of flowers. A garden race, of unknown origin. (B. M. 870, under name of *I. aphylla plicata.*)

I. prismatica (prismatic). *fl.* often in twos; limb 1½in. to 2in. deep, bright lilac-blue; falls with a roundish limb, under 1in. broad, much shorter than the strap-shaped claw; standard oblanceolate-unguiculate, erect, much shorter than the falls. May. *l.* linear, tufted, moderately firm. Stem 1½ft. to 2ft. high, slender, terete. Eastern United States. This species is very like *I. sibirica*, but it has exserted pedicels, and a small spathe. (B. M. 1504.)

I. Pseudo-acorus (bastard Acorus).* Yellow Iris, or Water Flag. *fl.* large, almost scentless, clustered; limb bright yellow, 2in. to 2½in. deep; falls rotundate, 1¼in. to 1½in. broad, bright orange-yellow, with a deeper spot at the throat, with radiating veins of brown; claw green down the back; standards oblanceolate, spathulate, erect, about ½in. long. April. *l.* ensiform, glaucous, 1in. broad. Stem 2ft. to 3ft. high, stout, terete, forked low down. Europe (Britain), Western Asia. A well-known and handsome bog-plant, of which there is a variety among two or three others, with variegated leaves. (F. D. 494; Sy. En. B. 1495.)

FIG. 330. IRIS PUMILA.

I. pumila (dwarf).* *fl.* small, solitary; limb bright lilac-purple, 2in. deep; falls oblong unguiculate, ¾in. broad, reflexing about half-way down, with a dense white beard down the claw and lower part of the keel; standards erect, same length and breadth as the falls, not quite so deep in colour. April. *l.* ensiform, about four in a tuft, slightly glaucous. Stem scarcely any. *h.* 4in. or [illegible]in. Europe, Asia Minor, [illegible]. An exceedingly pretty species, the type and its varieties making excellent subjects for edging or for bedding purposes. See Fig. 330. (B. M. [illegible].)

I. p. attica (Attic). *fl.* yellow; divisions feather-veined with brown lilac.

I. p. cærulea (blue). *fl.*, limb bright blue; beard of the falls bright yellow. (B. M. [illegible].)

I. rubro-marginata (red-margined).* *fl.*, tube 2in. long, green, tinged with purple towards the top; limb dead purple, 2in. to 2½in. deep; falls obovate-unguiculate, reflexing half-way down, with a purple beard; standards obovate-unguiculate, erect; spathe two-flowered, the valves keeled and margined with red. Spring. *l.* falcate-ensiform, 2in. to 3in. long, ½in. broad. Stem none. *h.* 4in. Scutari, 1875.

I. ruthenica (Russian). *fl.* fragrant; limb lilac-purple, 1½in. deep; falls oblong-unguiculate, with a reflexed lamina ½in. broad; standards oblanceolate-unguiculate, erect, ¼in. broad. Spring. *l.* much overtopping the flowers, linear, acuminate, firm, ribbed. Stems slender, 1in. to 4in. high, one-headed. Transylvania and Siberia to China, 1804. (B. M. 1123 and 1393.)

I. sambucina (Elder-scented).* *fl.* with a strong scent of Elder, large, disposed in clusters; limb 2in. to 2¼in. deep; falls obovate-cuneate, reflexing half-way down, little over 1in. broad, upper half plain claret-purple; beard yellow; standards obovate-unguiculate, erect, emarginate, 1¼in. broad, dull yellow, suffused with dull claret-purple. May. *l.* about six in a tuft, glaucous, 15in. to 18in. long, 1in. to 1¼in. broad. Stems 2ft. high, branched low down, bearing three or four clusters of flowers. Europe, Asia Minor, 1758. (B. M. 187.)

I. setosa (bristle-pointed). *fl.* clustered; limb bright lilac, 2in. to 2½in. deep; falls obovate unguiculate, 1in. broad, reflexing half-

Iris—*continued.*

way down; standards oblanceolate-spathulate, erect, ½in. long. May. *l.* thin, basal ones 1ft. or more long, about ¼in. broad. Stems 2ft. to 3ft. high, rather stout, branched low down. Eastern Siberia to Japan, 1844. A rare and handsome species, not unlike *I. sibirica*. SYN. *I. brachycuspis* (under which name it is figured in B. M. 2326).

I. sibirica (Siberian).* *fl.* two or three in a cluster; limb bright lilac-blue, 1½in. to 2in. deep; falls with an oblong blade, ¾in. to 1in. broad, much veined with bright violet on a light ground; standards rather shorter than the falls, erect, oblanceolate-unguiculate, about ½in. broad. May and June. *l.* linear, five to six in a tuft, greenish, ribbed, 1ft. to 2ft. long. Stem terete, fistulose, 1ft. to 2½ft. high, simple or forked. Central and Southern Europe to Siberia, 1596. A well-known species, and one of the commonest in cultivation. It requires plenty of sunshine and a rich damp soil to bring its beauty to full perfection. The forms of it are numerous, and varied in colouring. The variety with double flowers is not a handsome plant. (B. M. 60.)

I. speculatrix (watcher). *fl.*, limb lilac, the divisions subequal, obovate, emarginate at the apex; the reflexing lamina of the falls half as long as the claw, which is spotted with violet and white at the throat, and furnished for its lower two-thirds with a simple yellow crest with purple spots; standards erect and plain lilac. April. *l.* linear, strongly ribbed, acute, minutely toothed, and hyaline at the edge. Stems under 1ft. high, bracteated by several reduced leaves. Greenhouse. Hong Kong, 1876. (B. M. 6306.)

I. spuria (spurious). *fl.* in sessile or nearly sessile clusters; limb bright lilac, 1½in. to 2in. long; falls with a round blade under 1in. broad, hardly at all deflexed, furnished with a bright yellow keel beginning at the base of the limb and running down the claw, which is faintly streaked with purple on a white ground; standards oblanceolate, shorter than the falls, bright lilac. June and July. *l.* erecto-patent, 1ft. long, ½in. broad. Stem 1ft. to 2ft. high, little branched, stout, sub-terete. Europe, Asia, Algeria, 1759. (B. M. 58.)

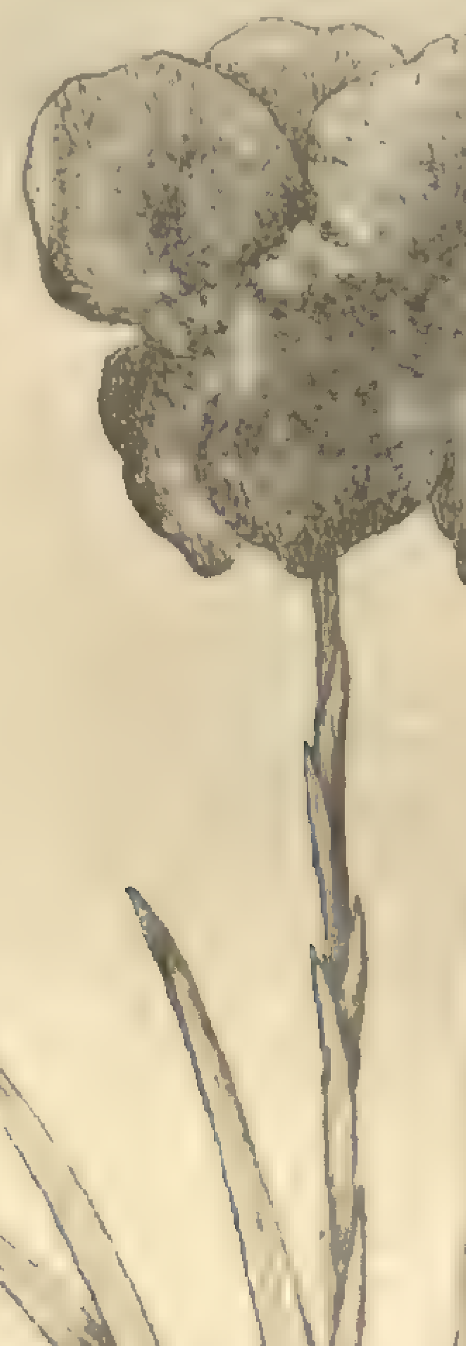


FIG. 331. IRIS SUSIANA.

I. squalens (daubed).* *fl.* in clusters, with a faint Elder-like scent; limb 2in. to 3in. deep; falls obovate-cuneate, 1½in. broad, reflexing half-way down, upper part bright lilac purple; beard bright yellow; standards length and breadth same as the falls, obovate-unguiculate, erect, rather crisped, dull lilac and yellow or brownish-yellow. May and June. *l.* tufted, ensiform, glaucous. Stems 2ft. to 3ft. high, branched half-way down, bearing three or four clusters of flowers. Europe, Asia, 1768. (B. M. 787.) Two desirable varieties are *atro-purpurea* and *lavendulacea*.

I. stenogyne (with narrow-stigma). A synonym of *I. Guldenstädtiana*.

I. stylosa (large-styled). A synonym of *I. unguicularis*.

I. subbiflora (sub-two-flowered). A synonym of *I. biflora*.

I. susiana (Susian).* *fl.* solitary; limb 3in. deep; falls and standards similar in size and shape, with a round blade, 1½in. to 3in. broad, cuneately narrowed to a short claw, with dense fine spots and lines of brown-black on a whitish groundwork tinged with lilac; falls reflexing about half-way up, densely pilose down the claw, with a broad cushion of brown-black hairs; standards erect, much spotted on a groundwork of brighter lilac. April. *l.* ensiform, stem-clasping, pale green, rather firm. Stem 1ft. to 1½ft. high. Levant, 1573. A most distinct and beautiful species, requiring a slight protection in winter in colder parts of the country. See Fig. 331. (B. M. 91.)

I. Swertii (Swert's). *fl.* very fragrant; limb 2in. to 2½in. deep; segments pure white, 1in. broad, slightly veined with lilac, purple towards the edge; falls obovate-cuneate, with a yellow beard; standards obovate-unguiculate, much crisped, pure white, except the purple keel and border. May. *l.* ensiform, glaucous. Stem 1ft. to 1½ft. high, bearing three or four clusters of flowers, slightly branched. A handsome plant, the native country of which is unknown. (S. B. F. G. ser. ii. 254.)

I. tectorum (roof).* *fl.*, limb bright lilac, 1½in. to 2in. deep; falls above 1in. broad, very obtuse, crisped at the edge, marked with deep lilac veins on a paler lilac groundwork, narrowed cuneately into a claw half as long as the limb, which is variegated with lilac streaks on a white ground, the deeply laciniated white and lilac crest ½in. deep; standards spreading, rather shorter than the falls, with an orbicular plain lilac limb; spathe single, terminal, two or three-flowered. June. *l.* ensiform, pale green, about 1ft. long, thin. Stem 1ft. or more high. Japan, 1872. A rare, but distinct and beautiful, species. SYN. *I. tomiolopha*. (B. M. 6118; G. C. n. s., vi. 37.)

I. tenax (strong). *fl.* solitary; limb bright lilac-purple, 2in. to 3in. deep; falls obovate-unguiculate, with a reflexing blade ¾in. to 1in. broad; standards nearly as long, ½in. broad, oblanceolate, with a long claw. May and June. *l.* two, linear, moderately firm. Stem 6in. to 12in. high, slender. North America, 1826. (B. M. 3343; B. R. 1218.) According to Douglas, the Indians make from the fibre derived from the leaves of this species "deer and elk snares sufficiently strong to take even the largest and most powerful of these animals; and it is also used by the women for making small bags and reticules, exactly the same as steel chain purses of fine workmanship, and for fishing."

I. tomiolopha (jagged-crest). A synonym of *I. tectorum*.

I. tridentata (three-toothed). *fl.*, limb lilac-purple, 2in. to 2½in. deep; falls obovate-unguiculate, 1in. or more broad, reflexing half-way down; claws white, veined with lilac; standards oblanceolate-spathulate, erect, about ½in. long; spathes two-flowered. May. *l.* ensiform, 1ft. to 1½ft. long. Stem slender, terete, hollow. North America, 1829. (B. M. 2886, under name of *I. tripetala*.)

I. tuberosa (tuberous).* Snake's Head. *fl.* solitary; limb 2in. to 2½in. deep; falls with an orbicular, obtuse, lurid purple, veinless lamina, ½in. to ¾in. broad, not more than half as long as the oblong spathulate claw, which is greenish-yellow on both sides, and ¾in. to 1in. broad at the middle; standards erect, under 1in. long, rhomboid, unguiculate; blade entire or tricuspidate; spathe with usually only a single large green valve, which often overtops the flower. April and May. *l.*, outer ones bract-like, lanceolate; inner ones two or three, weak, glaucous, tetragonal, erect. Stem weak, slender, hollow, about 1ft. long. Levant, 1597. A well-known species, and one of the earliest introduced into this country. (B. M. 531.)

I. unguicularis (clawed).* *fl.* solitary, fragrant; limb 3in. deep, bright lilac; falls obovate, 1in. broad, narrowed gradually into a linear claw, keeled with yellow and streaked with lilac on a white ground at the throat; standards nearly the same shape and size as the falls, lilac, erect. February. *l.* in a distichous basal tuft, linear, erect, firm. Plant stemless. Algeria. SYN. *I. stylosa* (under which name it is included in B. M. 5773).

I. variegata (variegated).* *fl.*, limb 2in. deep; falls oblong, cuneately narrowed to the base, ¾in. broad; upper part deep claret-brown, middle much veined with brown on a yellow groundwork; beard bright yellow; standards erect, oblong unguiculate, bright lemon-yellow. May. *l.* tufted, purple at the base, 1ft. to 1½ft. long, 1in. broad. Stem 1ft. to 1½ft. high, glaucous, forked low down, bearing three or four, one to two-flowered, terminal spathes. Eastern Europe, 1597. A handsome species, having several very desirable varieties. (B. M. 16.)

I. verna (spring). *fl.* solitary; limb 1½in. deep; segments oblong-unguiculate, both about ½in. broad; claw orange at the throat, spotted with black, and furnished with a central, slightly raised, scarcely villose line. Spring. *l.* linear, 6in. to 12in. long, slightly glaucous. Plant almost stemless. Southern United States, 1748. A scarce plant; several kinds are sold under this name. (S. B. F. G. 68.)

Iris—*continued.*

FIG. 332. IRIS VERSICOLOR, showing Habit and detached Portion of Inflorescence.

I. versicolor (various-coloured).* *fl.* clustered; limb claret-purple, under 2in. deep; falls obovate-unguiculate, reflexing half-way down; the roundish lamina ¾in. to 1in. broad, cuneate at the base; standards oblanceolate-spathulate, light claret-purple. June. *l.* ensiform, rather glaucous. Stem 1ft. to 2ft. high, terete, forked low down, with two or three clusters of flowers beside the end one. North America, 1732. A common and handsome species. See Fig. 332. (B. M. 21.)

I. virescens (greenish). *fl.*, tube greenish-yellow, 1in. to 1¼in. long; limb 2in. deep; falls oblong, cuneately narrowed to a claw, ½in. to ⅝in. broad, greenish-yellow, streaked in the lower half with dull purple; beard bright yellow; standards oblong-unguiculate, dull yellow, ⅝in broad, the claw spotted and streaked with green and dull purple. April and May. *l.* as in *I. lutescens.* Europe. According to Mr. Baker, this is the least ornamental or attractive of all the bearded Irises.

FIG. 333. IRIS CAUCASICA.

I. virginica (Virginian). *fl.*, limb 2in. to 2½in. deep, bright lilac-purple; falls round-unguiculate, reflexed half-way down; lamina 1in. broad, 1in. to 1¼in. long; standards erect, oblanceolate-spathulate, deep lilac, less than ½in. broad. June. *l.* firm, 1½ft. to 2ft. long, about 1in. broad. Stem 2ft. or more high, forked, compressed towards the base, terete upwards. North America, 1758. (B. M. 703.)

Sect. II. Xiphions.

I. alata (winged).* *fl.*, tube cylindrical, 3in. to 6in. long; limb bright lilac-purple, 3in. deep; falls oblong, 1in. broad, bright yellow at throat; inner segments oblanceolate-spathulate, 1in. long, spreading horizontally; spathe sessile, with lanceolate valves, 3in. to 4in. long. October to December. *l.* sub-erect, lanceolate, acuminate, nearly 1ft. long. Spain, Algiers, &c., 1801. A strikingly handsome species. (B. R. 1876.)

I. anglica (English). A garden synonym of *I. Xiphioides.*

I. caucasica (Caucasian). *fl.* in one-flowered spathes, scentless; limb pale yellow, 1½in. deep; falls obovate, ½in. broad, reflexing only in the upper third; stigmas broad, pale yellow, with deltoid crests. February and March. *l.* four to five, sharply falcate, lanceolate. Stem one to three-flowered, or very short. Caucasus to Persia. See Fig. 333. (S. B. F. G. 255.)

I. filifolia (thread-leaved).* *fl.*, tube 1in. long above the ovary; limb bright deep purple, 2½in. deep; orbicular lamina of the falls 1in deep, shorter than the panduriform claw, and keeled with bright yellow at the base; standards oblanceolate, erect; spathe 3in. to 4in. long, with pale green lanceolate valves. *l.* six or more; lower ones filiform, over 1ft. long; scarious outside ones at base of stem, flat, and mottled with deep purple. Stem slender, terete, 1ft. to 2ft. high, ending in a single spathe. Gibraltar, 1869. (B. M. 5928.) SYN. *Xiphion tingitanum* (of B. M. 5981, not of Baker).

FIG. 334. FLOWER AND LEAVES OF IRIS HISTRIO.

I. Histrio (actor).* *fl.*, tube 3in. to 4in. long, filiform, exserted; limb lilac-purple, 1½in. deep; falls copiously streaked and spotted with lilac on a paler ground, and keeled with yellow down the face; claw narrowed gradually from top to base; standards plain lilac, oblanceolate, erect; spathe one-flowered, sessile, in the centre of the leaf tuft; valves 3in. to 4in. long. February. *l.* about two to a tuft, and produced with several others, reaching 1ft. in length. Palestine, 1873. See Fig. 334. (B. M. 6033.)

I. juncea (rush-like). *fl.*, tube slender, 1in. to 1½in. long; limb pale yellow, 1½in. to 2in. deep; lamina of falls orbicular, 1in.

Iris—*continued.*

broad, as long as the broad claw; standards oblanceolate, erect, ½in. broad; spathe 2in. to 3in. deep, with lanceolate, acuminate valves. May and June. *l.* numerous, superposed, terete, under one line thick; lower ones 1ft. long. Stems flexuose, terete, 1ft. to 1½ft. high, ending in a single spathe. North Africa, 1869. In Algeria, according to Mr. Baker, the bulbs of this species are eaten. (B. M. 5890.)

FIG. 335. IRIS PERSICA.

I. persica (Persian).* *fl.* violet-scented; limb 1½in. to 2in. deep; falls oblong-spathulate, ½in. broad, cuneate at the base, pale yellowish-lilac, with a bright yellow beardless keel, waved at the edges. February and March. Stem none. *l.* four or five in a basal tuft, linear, recurved, 2in. to 3in. long at the flowering season. Asia Minor to South Persia. See Fig. 335. (B. M. 1.)

I. reticulata (netted).* *fl.*, tube 2in. to 3in. long, exserted; limb deep violet-purple, 1½in. deep; lamina of falls oblong, half as long as the oblong-cuneate claw, with a narrow paler keel, violet-spotted, and with a narrow yellow line down the centre; standards erect, oblanceolate; spathe one-flowered, sessile. February and March. *l.* generally two to a tuft, as high as the flower at flowering time, and growing afterwards to a length of 1ft. or more, one line thick. Caucasus, &c. See Fig. 336. (B. M. 5577; L. B. C. 1829; R. G. 452; S. B. F. G. ser. ii. 189.)

FIG. 336. IRIS RETICULATA.

I. r. Krelagei (Krelage's). This "differs from the type in being nearly or quite inodorous, with a tube not exserted from the spathe, and the colour of the limb a more slaty-purple, with the yellow keel of the lamina of the falls fainter, and the claw not merely keeled in the centre, but variegated with blotches and lines that reach to the edge" (J. G. Baker).

I. tingitana (Tangierian).* *fl.*, tube 1½in. long; limb lilac-purple, 3in. deep; orbicular blade of falls shorter than the panduriform claw; standards erect, oblanceolate; spathes two-flowered, 5in. to 6in. deep, with lanceolate acuminate valves. *l.*, lower ones linear-complicate, over 1ft. long, ½in. broad after leaving the stem; upper ones gradually smaller. Stem stout, terete, 2ft. to 3ft. high, ending in a single spathe. Tangiers, 1872. (B. M. 6775.)

I. vulgare (common).* *fl.*, tube scarcely any; limb 2in. to 2½in. deep; falls with an orbicular reflexing blade 1in. broad and deep, dashed with bright purple down the centre, and a broad erecto-patent claw; standards purple, erect; spathe valves 3in. to 4in. long. June. *l.* four or six below the spathe valves; lowest 1ft. or more long, linear-sub-terete, deeply channelled; upper ones gradually resembling the spathe valves. Stem 1ft. to 2ft. high, one or two-flowered. Portugal, 1596. See Fig. 337. (B. M. 686, under name of *I. Xiphium.*)

FIG. 337. IRIS VULGARE, showing Habit and detached Flower.

I. v. lusitanicum (Portuguese). *fl.* bright yellow, or more or less suffused with brown. (B. M. 679, under name of *I. lusitanica.*)

I. xiphioides (Xiphion-like).* *fl.*, limb deep lilac-purple, 2½in. to 3in. deep; blade of falls round-oblong, flushed with yellow down the face, and rather exceeding the deltoid claw; standards purple, erect, oblanceolate; spathe about 3in. deep. July. *l.* about six in a basal tuft, and three or four from the stem below the spathe; lower ones 1ft. long, linear, ⅓in. to ½in. broad, deeply channelled. Stem 1ft. to 2ft. high, two or three-flowered. Pyrenees. SYNS. *I. anglica*, of gardens, *Xiphion latifolium.* Of this species, there are numerous varieties in colour of flowers.

IRISH HEATH. *See* **Dabœcia polifolia.**

IRIS-ROOT. The same as **Orris-root** (which *see*).

IRON-TREE. *See* **Parrotia persica.**

IRON-WEED. *See* **Vernonia.**

IRONWOOD. A name applied in different countries to various trees with hard timber. In the United States, it is used for *Carpinus americana* and *Ostrya virginica.*

IRONWORT. *See* **Sideritis.**

IRREGULAR. Applied to flowers, the parts of which are dissimilar in size.

ISANDRA. Included under **Thysanotus** (which *see*).

ISATIS (the old Greek name, used by Dioscorides). ORD. *Cruciferæ.* This genus comprises from twenty-five to thirty species of erect, branched, annual or biennial herbs, spread over Southern Europe and Western Asia. Flowers often yellow, loosely racemose, ebracteate. Leaves entire, stem ones sagittate. The only species worthy of mention here is the one described below. Propagated by seeds sown in spring in almost any soil.

I. tinctoria (dyers'). Common Dyer's Woad. *fl.* yellow; panicles loose, erect, elongated. Spring. *l.*, lower ones stalked, ovate; upper ones sessile, sagittate, all more or less glaucous. *h.* 2ft. to 4ft. Europe (Britain), North Asia. An interesting biennial plant. The ancient Britains stained themselves with it; later, the Saxons imported it. It is still cultivated in Lincolnshire. (Sy. En. B. 161.)

ISCHARUM (from *ischein*, to check; in reference to the impoverished nature of the upper portion of the spadix). ORD. *Aroideæ* (*Araceæ*). A small genus of greenhouse tuberous herbs, now united, by Bentham and Hooker, to *Biarum*, from which they differ only in botanical details. For culture, *see* **Typhonium.**

I. angustatum (narrow). *fl.*, sheaths nearly white, embracing the base and middle of the spathe; spathe 6in. long, sheathing part nearly white, gradually expanding into an erect, almost black-purple blade; spadix slender, the female portion very short, the neutral part ½in. long and white, the male part 1in. long and black-purple. December. *l.* long, thick, petiolate, oblong-lanceolate, sub-acute. Tuber the size of a small potato. Syria, 1860. (B. M. 6355.)

I. Pyrami (Pyramus). *fl.*, spathe dark velvety-purple, short, broad-lanceolate, long-acuminate, twisted; tube ventricose; spadix almost equal to the spathe. January. *l.* elliptic-sub-obovate, on long attenuated petioles, obtuse at apex, obliquely nerved. Syria, 1861. (B. M. 5324.)

ISERTIA (named after P. E. Isert, a German surgeon). SYNS. *Brignolia*, *Bruinsmania*. ORD. *Rubiaceæ*. A genus comprising fifteen species of shrubs or trees, natives of Brazil, Guiana, and New Grenada. Flowers scarlet or red, rarely white or yellow, rather large, in many-flowered, thyrsoid, terminal, corymbose cymes, shortly pedicellate. Leaves large, opposite, rarely ternate, verticillate, thick, coriaceous, acuminate. *I. coccinea*, perhaps the only species in cultivation, is a very handsome stove evergreen shrub, requiring a compost of peat and loam, with the addition of a little charcoal and silver sand. Increased by cuttings, inserted in sandy soil, in heat, during spring and summer.

I. coccinea (scarlet). *fl.* scarlet, velvety on the outside, 1in. long; thyrse terminal, many-flowered, panicled. July. *l.* oval, acuminated at both ends, downy beneath. *h.* 8ft. to 12ft. Guiana, 1820.

ISMELIA. Now included under *Chrysanthemum.*

ISMENE. Included under **Hymenocallis** (which *see*).

ISOCHILUS (from *isos*, equal, and *cheilos*, a lip; in allusion to the shape of the labellum). ORD. *Orchideæ*. A genus of four or five species of epiphytal stove orchids, ranging from Mexico and the West Indies to Brazil. Flowers rose or red, in one row, in spike-like racemes, small or medium; labellum free from the column, contracted at the base with a slight S-like curvature. Stems bearing the leaves in two rows. Perhaps the only species at present in cultivation is *I. linearis*. For culture, *see* **Pleurothallis.**

I. linearis (linear). *fl.* purplish, small, in short spikes. Spring. *l.* short, narrow, on tufted slender stems 1ft. high. Mexico, &c., to Brazil, 1791. (L. B. C. 1341.)

ISOLEPIS. This genus is now included, by the authors of the "Genera Plantarum," under **Scirpus** (which *see*).

I. gracilis (slender). A garden name for **Scirpus riparius** (which *see*).

ISOLOMA (from *isos*, equal, and *loma*, a border; lobes of corolla equal). SYN. *Kœhleria*. Including *Brachyloma*, *Calycostemma*, *Pearcea*, and *Tydæa*. ORD. *Gesneraceæ*. A genus comprising about sixty species of ornamental stove herbs, often confused with *Achimenes* and *Gesnera*, natives of the Western hemisphere, from Bolivia and Peru to Mexico. Flowers often scarlet, golden, or spotted. Leaves opposite, often softly villous. For culture, *see* **Gesnera.**

I. bogotense (Bogotan). *fl.* copious, rather large, drooping; corolla full yellow, rich red above, streaked and dotted with red within; tube funnel-shaped, gibbous above; limb spreading, five-lobed; calyx almost entirely free; peduncles single-flowered. Autumn and early winter. *l.* opposite and ternately verticillate, petiolate, ovate-cordate, serrate, rich velvety-green, mottled and reticulated with white or pale green, always whitest in the middle. Stems erect, but little branched, 1ft. to 2ft. high. Bogota, 1844. Plant hairy. SYN. *Achimenes picta* (under which name it is figured in B. M. 4126).

I. Ceciliæ (Cecilia Franchomme's). *fl.* bright rose; inside of the tube white and spotted. *l.* dark velvety. *h.* 1ft. to 1½ft. Cundinamarca, 1877.

Isoloma—*continued.*

I. Deppeanum (Deppe's). *fl.* orange-red, in four-flowered villous umbels; corolla 1in. long, ¼in. across, tubular, clavato-ventricose, dilated and somewhat fleshy at its base; limb spreading; lobes sub-equal. Summer. *l.* 3in. to 6in. long, 1½in. to 2½in. broad, opposite and decussate, petiolate, lanceolate, acuminate, serrated, harshly pubescent and bright green above, white with soft tomentum beneath. *h.* 2ft. to 3ft. Central America, &c. SYN. *Gesneria elongata* var. (under which name it is figured in B. M. 3725).

I. digitaliflorum (Foxglove-flowered). *fl.* very large, deflexed, corolla shaggy, rosy-purple above, white beneath; throat white, spotted with crimson; limb green, dotted purple; panicles short, terminal. *l.* large, ovate-acuminate, hairy. Stems erect, hairy. New Grenada.

I. hondense (Honda).* *fl.*, calyx cup-shaped, five-toothed, tipped with red; corolla yellow, 1in. or more long, tubular, sub-ventricose; mouth contracted; limb of five short, equal, spreading lobes; tube clothed with bright red hairs; peduncles longer than the flower, axillary, solitary, or two or three together, hairy. December. *l.* opposite, spreading, ovate, acute or sub-acuminate, serrate, hairy; petioles ¼in. to ¾in. long. Stem erect, 1ft long. Honda, New Grenada, 1843. This plant may, by a little management in forcing or retarding the tubers, be made to blossom at almost every season of the year. SYN. *Gesneria hondensis* (under which name it is figured in B. M. 4217).

I. hypocyrtiflorum (Hypocyrta-flowered). *fl.* orange-red, velvety-pubescent, nearly globose, about 1in. long; mouth nearly closed. *l.* cordate-ovate, bluntish, velvety, emerald green, traversed by silvery ribs. Ecuador, 1866. SYN. *Gloxinia hypocyrtiflora* (under which name it is figured in B. M. 5655).

I. Lindenianum (Linden's). *fl.* white; throat marked on the lower side by a deep violet band; upper lip with a dash of yellow and a narrow zone of purple; tubes short. *l.* ovate, hairy, olive-green; costa and principal veins marked by broad silvery stripes, and having bright green veins intervening. Stems erect, hairy. Ecuador, 1868.

I. molle (soft). *fl.* three to five in an umbel, on extremely short peduncles; corolla red, densely hairy, funnel-shaped; lobes of limb orange, spotted with red, acute, reflexed. Winter. *l.* clothed with long, dense, silky hairs. Stems 1½ft. high, shrubby, hairy. Caraccas, 1819. SYN. *Gesneria mollis* (under which name it is figured in B. M. 3815).

I. ocellatum (eyleted). *fl.*, calyx hairy, tube red; corolla bright red, drooping, pubescent; limb campanulate, segments marked with white spots, bearing a black dot in the centre; peduncles red, erect, slender, shorter than the leaves. Winter. *l.* large, opposite, ovate, acuminate, copiously reticulated with veins, and wrinkled; under side purple; upper side dark shining green, glabrous; edges serrated; petioles 1in. or more long, purple. Panama, 1847. Stove. SYN. *Achimenes ocellata* (under which name it is figured in B. M. 4359).

I. pictum (painted). *fl.* in a terminal, elongated, leafy raceme; corolla scarlet, yellow beneath and at the mouth, very hairy and velvety; lobes of limb spotted. Summer till late autumn. *l.* opposite or ternate, ovate, acuminate, serrated, hairy, rich red-purple beneath. *h.* 3ft. Columbia, 1848. (B. M. 4331, under name of *Gesneria picta*.)

I. Schiedeanum (Schiede's). *fl.* copious from the axils; corolla rich scarlet, between campanulate and infundibuliform, clothed with long hairs; limb five-lobed, yellow, streaked with dotted lines of red; calyx short, turbinate, tomentose; peduncles aggregated, shorter than the leaves, one or three-flowered. November. *l.* generally in whorls of three, soft and downy above, paler and tomentose beneath. Stem tinged with red. *h.* 1½ft. Mexico, 1844. (B. M. 4152, under name of *Gesneria Schiedeana*.)

I. Seemanni (Seemann's). *fl.*, calyx shallow, cup-shaped; corolla bright brick-red, a little inclining to orange; tube orange at base, short, nearly cylindrical; limb spotted with deep red, and clothed with glandular hairs; peduncles hairy. October. *l.* opposite and ternate; lower ones large, broadly ovate or sub-ovate, coarsely serrate, acute, on rather long petioles; upper ones gradually smaller. Stem simple, 2ft. or more high. Panama, 1848. SYN. *Gesneria Seemanni* (under which name it is figured in B. M. 4504).

I. triflorum (three-flowered). *fl.* in umbels of three, on solitary axillary peduncles; corolla yellow, ventricose, densely clothed with shaggy red hair; mouth spotted; limb five-lobed; calyx woolly, hemispherical. Summer. *l.* opposite, 4in. to 6in. long, ovate, acuminate, serrate, upper surface dark green, wrinkled with copiously reticulated nerves, and downy beneath, on woolly petioles. *h.* 1½ft. to 2ft. New Grenada, 1846. SYN. *Gesneria triflora* (under which name it is figured in B. M. 4342).

ISOLOMA (of J. Smith). *See* **Lindsæa.**

ISOMERIS (from *isos*, equal, and *meris*, part; the petals, stamens, and pistils are of equal length). ORD. *Capparideæ*. A monotypic genus. The species is a half-hardy deciduous shrub, having a disagreeable odour, a long tap root, and a very spreading head. It thrives

Isomeris—*continued.*

best in a compost of sandy loam and leaf mould. Propagated in autumn, by cuttings of ripe shoots.

I. arborea (tree-like). *fl.* yellow, large, in terminal racemes; petals four, equal, sessile. May. *l.* trifoliolate, lanceolate, mucronulate, glabrous. Stem thick, very knotty. *h.* 10ft. California, 1839. (B. M. 3842.)

ISONANDRA (from *isos*, equal, and *aner, andros*, the stamen; number of fertile and barren stamens equal). ORD. *Sapotaceæ.* A genus comprising six species of glabrous or pubescent milk-bearing trees, natives of India and Ceylon. Flowers small, inconspicuous, produced in little clusters, either in the angles of the leaves or at the ends of the young branches. Leaves entire, leathery. The species described below is a stove evergreen tree, of great commercial value and utility. It thrives in a compost of sandy peat and fibry loam. Increased by cuttings, inserted in sandy soil, under a bell glass, in heat.

I. gutta (Gutta). Gutta-percha Tree. *fl.* inconspicuous, disposed in small axillary or terminal clusters. *l.* entire, coriaceous. Borneo, 1847. The correct name of this tree, which yields the well-known Gutta-percha of commerce, is *Dichopsis gutta.*

ISOPLEXIS (from *isos*, equal, and *pleko*, to plait; the upper segment of corolla is equal in length to the lip). SYN. *Callianassa.* ORD. *Scrophularineæ.* A genus comprising two species of very handsome greenhouse evergreen shrubs. Flowers in terminal pedunculate racemes; corolla tubular at the base, campanulate; upper segment of limb equal in length to the lip, and, like it, incumbent in æstivation. The species thrive in a compost of sandy loam and leaf mould. Half-ripened shoots will root, during spring, in sand, under a bell glass.

I. canariensis (Canary). *fl.* golden-yellow, dense; segments of the corolla acute. June. *l.* permanent, lanceolate, serrated. *h.* 4ft. to 6ft. Canary Islands, 1698. SYN. *Digitalis canariensis.* (B. R. 48.)

I. sceptrum (sceptre). *fl.* yellowish-brown, dense; segments of corolla obtuse. July. *l.* obovate-lanceolate, denticulated. *h.* 3ft. to 4ft. Madeira, 1777. SYN. *Digitalis sceptrum.* (S. E. B. 73.)

ISOPOGON (from *isos*, equal, and *pogon*, a beard; referring to the beard-like fringes on all parts of the inflorescence). ORD. *Proteaceæ.* A genus comprising about twenty-nine species of greenhouse evergreen shrubs, limited to extra-tropical Australia, and having the habit of *Petrophila.* Flowers yellow, pink, or lilac, in dense spikes or cones, each flower sessile, within a bract or scale; the cones hemispherical, globular, or ovoid, terminal, or rarely axillary. Leaves rigid, entire or divided, terete or flat, and sometimes broad. For culture, *see* **Protea.** The following is a selection of the species introduced:

I. anemonifolius (Anemone-leaved). *fl.*, perianth yellow, glabrous, except the terminal tufts of short hairs; cones sessile, solitary, or in clusters of two or three at the ends of the branches, nearly globular. July. *l.* on rather long petioles, once or twice trifid or pinnately divided, with linear or linear-acute, entire, bi- or trilobed segments. *h.* 4ft. to 6ft. 1791. (L. B. C. 1337; B. M. 697, under name of *Protea anemonifolia.*)

I. attenuatus (attenuated). *fl.*, perianth pale yellow; laminæ villous outside; the tube glabrous, or nearly so; cones terminal or in the upper axils, sessile, depressed, globular. April. *l.* oblong-spathulate to almost linear, with a small straight or hooked point, much narrowed into the petioles, thick, and almost veinless. *h.* 2ft. to 3ft. (B. M. 4372.)

I. Baxteri (Baxter's). *fl.*, perianth pink, very villous; cones depressed, globular, terminal, often clustered amongst numerous floral leaves. April. *l.* from broadly cuneate, undulate, and toothed only at the end, to twice or thrice three-lobed. *h.* 2ft. 1831. (B. M. 3539.)

I. cuneatus (cuneate). *fl.*, perianth pale purple, glabrous, or with small tufts at the lips of the laminæ; cones terminal, depressed, globular. June. *l.* from obovate-oblong to lanceolate or oblanceolate, obtuse, with a small callous point, rather thick, obscurely veined. *h.* 7ft. to 8ft. 1830. (B. M. 3421, under name of *I. Loudoni.*)

I. longifolius (long-leaved). *fl.*, perianth yellow, silky-villous; cones terminal, sessile, ovoid or at length globular. April. *l.* long, linear or oblanceolate, obtuse with a small callous or acute point, narrowed into a long petiole. *h.* 2ft. to 8ft. 1823. (B. R. 900.)

Isopogon—*continued.*

I. roseus (rose). *fl.*, perianth pink, glabrous, tipped with small tufts of hairs; cones terminal, globular, solitary or clustered. April. *l.* once or twice ternately divided or shortly pinnate; the segments linear or cuneate, entire or three-lobed, rigid, flat, concave or channelled, acute, but scarcely pungent. *h.* 1ft. to 4ft. 1840. (B. M. 4037, under name of *I. scaber.*)

I. sphærocephalus (globe-headed). *fl.*, perianth tube glabrous; the laminæ densely hirsute, with yellow hairs; cones solitary and terminal, or two or three crowded at the ends of the branches, globular. March. *l.* linear or almost lanceolate, obtuse, with a short callous point, slightly contracted towards the base, but sessile; margins often recurved, and the midrib prominent beneath. *h.* 4ft. (B. M. 4332.)

ISOPYRUM (from *isos*, equal, and *Pyros*, Wheat; a Greek name applied to another plant). Including *Enemion* and *Leptopyrum.* ORD. *Ranunculaceæ.* This genus contains about seven species of dwarf, slender perennial herbs, natives of the temperate regions of the Northern hemisphere. Flowers white, solitary or loosely paniculate. Leaves ternate, decompound; leaflets stalked, three-lobed, or cut, membranous. The only species in cultivation is *I. thalictroides*, which is a very graceful little subject, with foliage resembling a Maidenhair Fern. It looks extremely pretty when grown on rockwork or a border, and thrives in almost any moderately good garden soil. Propagated by seeds; or by division of the roots, in autumn.

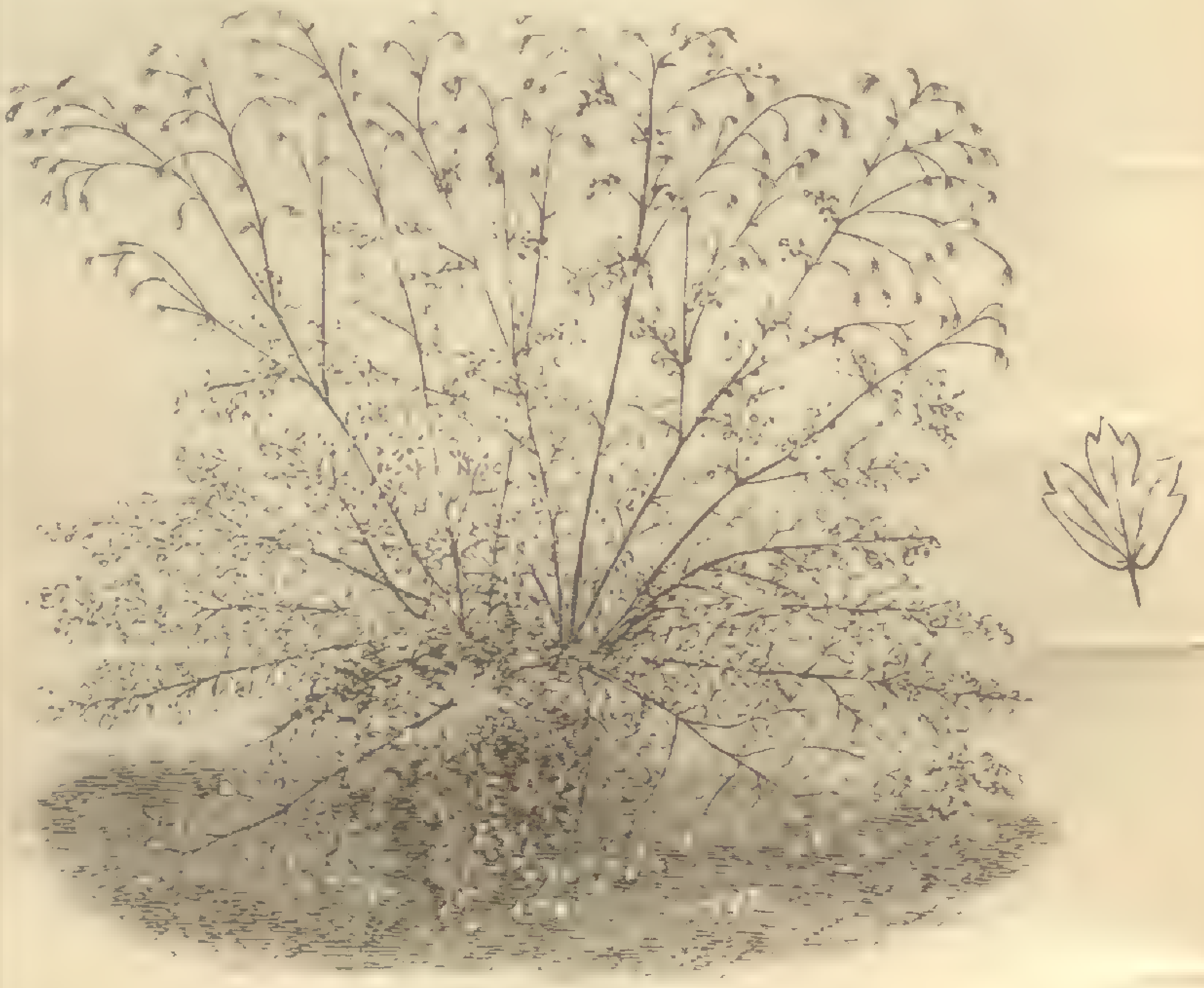


FIG. 338. ISOPYRUM THALICTROIDES, showing Habit and detached Leaflet.

I. thalictroides (Thalictrum-like).* *fl.* white, small; sepals blunt. Spring. *l.*, leafstalks dilated at the base into membranous auricles. Root creeping, fascicled, or grumose. *h.* 9in. to 15in. Europe, 1759. See Fig. 338.

ISOTOMA (from *isos*, equal, and *toma*, a section; segments of corolla equal). ORD. *Campanulaceæ.* A genus comprising eight species of stove or greenhouse herbaceous perennials, formerly included under *Lobelia.* Flowers in axillary or terminal racemes. Leaves alternate, entire, largely dentate or pinnatifid. For culture, *see* **Lobelia.**

I. axillaris (axillary-flowered). *fl.* blue; corolla flat, with long green tubes; peduncles axillary, elongated, and one-flowered. Autumn. *l.* sessile, pinnatifid, toothed. *h.* 1ft. Australia, 1824. Greenhouse perennial. (B. M. 2702, under name of *Lobelia senecioides.*)

I. a. subpinnatifida (sub-pinnatifid) has the laciniæ of the leaves longer than in the type, and not unfrequently again pinnatifid. SYN. *I. senecioides subpinnatifida* (under which name it is figured in B. M. 5073).

I. Brownii (Brown's). *fl.* purple, racemose. Autumn. *l.* linear, quite entire. Stems almost simple. *h.* 1ft. West Australia, 1829. Greenhouse annual. (B. M. 3075, under name of *Lobelia hypocrateriformis.*)

Isotoma—*continued.*

I. longiflora (long-flowered). *fl.* white; tube of corolla very long and slender. Summer. *l.* obovate-lanceolate, coarsely toothed, pubescent. West Indies, 1752. Greenhouse perennial. A very poisonous plant. (B. R. 1200, under name of *Lobelia longiflora.*)

I. senecioides subpinnatifida (Sececio-like, sub-pinnatifid). A synonym of *I. axillaris subpinnatifida.*

ISOTROPIS (from *isos*, equal, and *tropis*, a keel; in reference to the shape of the carina). ORD. *Leguminosæ.* A genus of eight species of greenhouse herbs or under-shrubs, with diffuse or ascending stems. Flowers solitary, on axillary peduncles, or forming a loose terminal raceme. Leaves alternate, simple or unifoliolate, with linear-falcate or minute stipules. The species are all Australian. *I. striata*, perhaps the only one in cultivation, requires treatment similar to **Chorizema** (which *see*).

I. striata (striated). *fl.*, standard yellow with purple streaks, large; wings and keel purple. Spring. *l.* not numerous; lower ones obovate or cuneate, very obtuse, truncate or broadly two-lobed; upper ones narrower, and sometimes acute. Some branches quite leafless and dichotomous. *h.* 6in. to 18in. A hairy perennial or under-shrub. SYN. *Chorizema spartioides* (under which name it is figured in L. B. C. 1953).

ITEA (from *Itea*, the Greek name of the Willow, as far back as Homer; applied to this genus on account of the quick growth of the species named below). ORD. *Saxifrageæ.* A genus comprising about five species of trees and shrubs, natives of North-west America, Japan, China, Java, the Himalayan Mountains, and Khasia. Flowers white, small. Leaves alternate, petiolate, oblong or lanceolate, glandulose-dentate or crenate. The only representative of this genus yet introduced is *I. virginica*, an ornamental hardy deciduous shrub, which, when in a vigorous condition, during autumn, is entirely covered with its racemes of white flowers. It thrives best in a moist sandy or peat soil. Increased, in spring, by seeds, or by suckers; and, in summer, by layers.

I. virginica (Virginian). *fl.* white; racemes simple, terminal. June. *l.* alternate, simple, oblong, pointed, minutely serrate. *h.* 6ft. to 7ft. North America, 1744. (B. M. 2409.)

IVY. *See* **Hedera.**

IXANTHUS (from *Ixos*, Mistletoe, and *anthos*, flower; in reference to the glutinous nature of the flower). ORD. *Gentianeæ.* A monotypic genus. The species is an erect greenhouse biennial herb, native of the Canary Islands. It thrives in well-drained fibrous loam, and requires a light, airy place in a cool greenhouse. Propagated by seeds, sown in spring.

I. viscosa (clammy). *fl.*, corolla yellow, salver-shaped; tube white, twice the length of the calyx; limb five-cleft. June and July. *l.* ovate-lanceolate, quite entire, three or five-nerved; upper ones often connate. Branches opposite, crossed. Stem erect. *h.* 1ft. to 1½ft. Canaries. (B. M. 2135, under name of *Gentiana viscosa.*)

IXAUCHENUS. A synonym of **Lagenophora** (which *see*).

IXIA (from *ixia*, the Greek name used by Theophrastus for birdlime; referring to the clammy juice). SYN. *Würthea.* Including *Morphixia.* ORD. *Irideæ.* A genus containing about twenty-five species of pretty greenhouse (or hardy in sunny, sheltered, dry spots, in the extreme south of Britain) bulbous plants, all natives of South Africa. Flowers in simple or branched spikes; perianth tube long, slender; limb regular, salver-shaped. Leaves narrow, ensate. Stems slender, simple or slightly branched. Propagation is readily effected by seeds; or by offsets, which are freely produced. Seeds should be sown in pans of sandy soil, about September, and placed in a cool frame. The young plants may remain in the seed-pans for the first year, when they should be either potted singly or planted out. It takes from three to four years before they flower. By growing a number of varieties together, and saving their seed, numerous other sorts may be obtained, usually much varied in colour, and in the markings of the flower. Propagation by offsets is a much quicker method, as the plants then generally flower the second year. Offsets may be secured in quantity after the parent Ixias have ripened off, and they should be stored in a dry place, until starting time, the following autumn.

Cultivation in Pots. Ixias, cultivated as pot plants, are very attractive, and admirably adapted for conservatory and cool greenhouse decoration, in early summer. The bulbs should be potted rather firmly, in sandy loam and leaf soil, during October, placing about six or eight in a 5in. pot, and covering them with 1in. of soil. The pots may then be plunged or stood on ashes in a cool frame, and but little water will be required throughout the winter. When the flower-spikes appear, more water may be given, and the plants fully exposed to light and plenty of air: draughts, however, must be avoided. After flowering, growth and a gradual ripening should be encouraged, by keeping the plants watered for a time. When the leaves die away, the bulbs may be shaken out and stored in bags until the autumn, or they may be allowed to remain in the soil and be kept dry.

Where the cultivation of Ixias is attempted outside, a well-drained, sunny, south border should be selected, and the bulbs planted about 6in. deep, in autumn. They should be lifted annually after being ripened, unless the locality is favourable enough to ensure their safety when left outside. Ixias do not require much heat, and, moreover, do not succeed well in a high temperature.

I. aulica (courtly). *fl.* rose-coloured, numerous; spathe almost equal to the tube. April. *h.* 2ft. 1774. SYN. *Morphixia aulica.* (B. M. 1013, under name of *I. capillaris aulica.*)

I. candida (white). A synonym of *I. leucantha*

I. capillaris (capillary).* *fl.* flesh-colour or lilac; spathe scarious, membranous, paper-like, having five rib-like streaks ending in as many teeth. April. *h.* 1½ft. 1774. SYN. *Morphixia capillaris* (B. M. 617.)

I. columellaris (pillar-formed). *fl.* striped; filaments united at base. August. *h.* 6in. 1790. (B. M. 630.)

I. flexuosa (bending-stalked). *fl.* pink; tube slender, a little enlarged; limb below bell-shaped, contracted. April and May. *h.* 2ft. 1757. (B. M. 624.)

I. fucata (painted). *fl.* pink, salver-shaped; tube clavate, straight; spike one or two-flowered. June and July. *l.* grass-like. *h.* 1ft. 1779. (B. M. 1379.)

I. hybrida (hybrid).* *fl.* white; raceme flexuose, many-flowered. April and May. *l.* slender. *h.* 1ft. 1757. (B. M. 127, under name of *I. flexuosa.*)

I. leucantha (white-flowered). *fl.* white, one-sided; spathes toothed, shorter than the tube. May. *l.* linear-ensiform. *h.* 1½ft. 1779. SYNS. *I. candida, I. patens leucantha.*

I. linearis (linear). *fl.* scentless; outer valve of spathe subtruncate, streaked with three brown veins ending in short teeth; segments of perianth striped with three longitudinal darker coloured veins. April. SYN. *Morphixia linearis.* (B. M. 570, under name of *I. capillaris [illegible].*)

I. maculata (spotted).* *fl.* orange-coloured; limb spreading, spotted at base; stigmas not divided lower than base of anthers. April and May. *h.* 1ft. 1757. (B. M. 539, under name of *I. conica.*)

I. m. ochroleuca (yellowish-white). *fl.* cream-coloured, in spiked heads; tube shorter than segments. May and June. *l.* linear-ensiform. *h.* 2ft. 17[illegible]. (B. M. [illegible]; A. B. R. [illegible], under name of *I. capitata.*)

I. monadelpha (monadelphous). *fl.* blue; filaments united in a tube. April and May. *h.* [illegible]in. 17[illegible]. (B. M. 607.)

I. odorata (sweet-scented).* *fl.* yellow, very fragrant; corolla salver-shaped; limb longer than the spathe; segments almost equal; spike many-flowered. May and June. *h.* 1ft. [illegible]. SYN. *Morphixia odorata.* (B. M. 1173, under name of *I. [illegible].*)

I. patens (spreading-flowered).* *fl.* pink; tube filiform; limb bell-shaped, spreading; stigmas longer than the anthers. April. *h.* 1ft. 17[illegible]. (B. M. 522.)

I. p. leucantha (white-flowered). A synonym of *I. leucantha.*

I. polystachya (many-spiked). *fl.* variegated; limb spreading, not spotted; stigmas divided as low as the tube. May and June. *h.* 1½ft. 1757. (A. B. R. [illegible].) There is a variety *[illegible].*

I. speciosa (showy).* *fl.* dark red; limb hemispherical, campanulate; stigmas longer than the anthers. May and June. *h.* 6in. 1778. (B. M. [illegible]4, under name of *I. crateroides.*)

Ixia—*continued.*

I. viridiflora (greenish-flowered).* *fl.* green, spotted at base; scape many-spiked, many-flowered. May and June. *l.* linear-ensiform, edged. *h.* 1ft. 1780. (B. M. 549, under name of *I. maculata viridis.*) There are two varieties: *cana* (B. M. 789, under name of *I. maculata amethystina*) and *cæsia* (A. B. R. 530, under name of *I. maculata cæsia*).

IXIOLIRION (from *Ixia*, and *Leirion*, a Lily; Ixia-like Lily). SYN. *Kolpakowskia.* ORD. *Amaryllideæ.* A genus of two species of elegant half-hardy bulbous plants, with loose racemes of large trumpet-shaped flowers, and narrow, grass-like leaves. Probably the two species here mentioned are simply forms of one. They thrive best in an open, dry, sunny, and well-drained border, and the most suitable soil is a light loamy one. If cultivated outside, the protection of a handlight is needful, when commencing growth, in spring. The bulbs may be carefully lifted in the autumn, and stored away in a dry place.

I. Kolpakowskianum (Kolpakowski's). *fl.* blue or white; perianth trumpet-shaped, with a long, slender tube, and six narrow-acute segments. Summer. *l.* linear. *h.* 1ft. Lake Saivan, 1878. SYN. *Kolpakowskia ixiolirioides.* (R. G. 953.)

I. montanum (mountain). A synonym of *I. tataricum.*

I. Pallasi (Pallas's). A synonym of *I. tataricum brachyantherum.*

I. tataricum (Tartar). *fl.* blue; segments more or less spreading or recurved; inflorescence sometimes paniculate. June. *l.* broadly linear. *h.* 1ft. to 1½ft. Central Asia, &c., 1844. SYN. *I. montanum.* (B. R. 1844, 66.)

FIG. 339. IXIOLIRION TATARICUM BRACHYANTHERUM, showing Habit, Raceme, and detached Flower.

I. t. brachyantherum (short-stamened). *fl.* beautiful deep blue, 2in. in diameter; umbel terminal. Summer. *l.* linear-lanceolate. Stem erect. *h.* 1¼ft. 1874. SYN. *I. Pallasi.* See Fig. 339. (R. G. 910.)

I. t. Ledebourii (Ledebour's). This differs from the type principally in the curvature of the anthers after flowering. Central Asia, 1880. (R. G. 1014.)

IXODIA (from *ixodes*, viscid; in reference to the viscid secretions on the plant). ORD. *Compositæ.* A monotypic genus. The species is a glabrous greenhouse evergreen shrub, from Australia. It thrives in a compost of sandy peat and a little fibry loam. Propagated in May, by cuttings of the young shoots, getting hard at their base, inserted in sand, under a bell glass, in a close frame or pit.

I. achilleoides (Achillea-like). *fl.-heads* in a dense terminal corymb, very much resembling those of *Achillea*, the white, petal-like, radiating laminæ of the inner involucral bracts being similar to the ray-florets of that genus; involucre glutinous, with green centres, and often slightly woolly. June. *l.* linear-lanceolate or slightly spathulate, usually acute, mostly above 1in. long, more or less decurrent on the stem. *h.* 1½ft 1803. (B. M. 1534.)

IXORA (the name of a Malabar idol, to which the flowers of some of the species are offered). SYNS. *Siderodendron, Sideroxyloides.* ORD. *Rubiaceæ.* A genus comprising about 100 species of stove evergreen shrubs or small trees, natives, for the most part, of the tropical regions of Asia and Africa, and rarely of America, Australia, and the Islands of the Pacific. Flowers scarlet, pink, or white, handsome, in terminal corymbs; corolla salver-shaped; tube long, slender. Leaves opposite, rarely ternate, verticillate, coriaceous, petiolate or sessile. Ixoras are amongst the most handsome and gorgeous of stove flowering plants. They are usually of a compact bushy habit, requiring but little training, and the foliage itself is by no means unattractive. Propagation is readily effected by cuttings: these should be short-jointed, and moderately firm, and be inserted singly in small pots, which should afterwards be plunged, in a close frame, with a bottom heat of about 80deg., and kept shaded. Roots will, as a rule, soon be emitted; the plants may then be inured to the open house, and placed in 5in. pots. If kept in a high temperature, and supplied with plenty of moisture, they soon grow. Some of the species and hybrids flower in this size, and are very attractive. A compost of fibry peat, a little leaf soil, and plenty of silver sand, is most suitable for Ixoras at all stages of their growth. It should be made rather fine for cuttings, and used in a rough state for established plants. Almost any amount of heat and moisture may be applied to these subjects in summer; but a cooler and somewhat drier atmosphere should be maintained in autumn and winter, for ripening the wood. Young plants succeed and grow freely, if plunged in a bed of fermenting material; but this should not be allowed to become very hot. A little shade from bright sunshine is advisable in summer time; but in dull weather, and at other seasons, all possible light should be admitted.

I. acuminata (pointed-leaved). *fl.* pure white, fragrant, large; tube 1½in. long; corymbs decompound, crowded, almost sessile. *l.* petiolate, broad-lanceolate, acuminated, smooth. *h.* 3ft. to 6ft. India.

I. barbata (bearded). *fl.* in terminal sub-corymbose panicles; calyx tube reddish-green, globose; corolla tube greenish-white, 1½in. long, slender, a little curved; limb pure white within; mouth encircled with a delicate fringe of hairs. July. *l.* elliptic-oblong, acute, penninerved, sub-coriaceous, glossy, short, petioled; stipules ovate, acuminate. *h.* 6ft. Andaman Islands, &c., 1823. Stove. (B. M. 4513.)

I. chelsoni (Chelsea).* *fl.* bright orange-salmon, shaded with pink; corymbs very large, full, round. Summer. A very handsome garden hybrid, having a profuse-flowering and dwarf-branching growth.

I. coccinea (scarlet).* *fl.* bright red, disposed in very large heads or corymbs, which are umbellate; tube of corolla nearly 2in. long. Summer. *l.* sessile, cordate, oblong, acute, shining. *h.* 3ft. to 4ft. East Indies, 1814. An elegant plant. SYN. *I. grandiflora* (B. R. 154.)

I. c. Bandhuca (Bandhuca). *fl.* deep scarlet; tube over 1in. long; corymbs contracted. Summer. *h.* 2ft. to 4ft. India, 1815. (B. R. 513.)

I. c. superba (superb). A handsome variety, having deeper-coloured flowers, and much broader and thicker petals, than the typical species. It is also of a more vigorous growth. Java, 1846.

I. Colei (Cole's).* *fl.* pure white, numerously produced in large round corymbs. *l.* dark green, roundish. A very handsome strong, free, and robust growing garden hybrid, remaining in flower for a considerable length of time. A cross between *I. coccinea* and *I. stricta alba.*

I. concinna (neat).* *fl.*, when first expanding, of a bright salmon-colour, gradually changing to deep salmon-pink, disposed in large and compact corymbs. An extremely handsome garden hybrid of 1882.

I. congesta (crowded). *fl.* bright orange, corymbose. Summer. *l.* broad-oblong. *h.* 4ft. Tenasserim, 1845. (B. M. 4325, under name of *I. Griffithii.*)

I. decora (decorous). *fl.* yellow, flaked with rosy-crimson, very large, disposed in noble corymbs. A handsome and attractive garden form. 1882.

I. Dixiana (Dixie's). *fl.* dark orange; corymbs very large. A handsome seedling form, of a good hardy constitution, and free-flowering habit. 1868.

I. Duffii (Duff's). A synonym of *I. macrothyrsa.*

I. floribunda (abundant-flowering). *fl.* reddish-scarlet, disposed in large dense corymbs. An excellent garden variety, of robust growth.

Ixora—*continued.*

I. Fraseri (Fraser's).* *fl.* brilliant flamed salmon-colour; corolla tubes carmine-scarlet; corymbs numerous, large, terminal, globular. *l.* rich dark green. A most effective and beautiful garden variety, of free and vigorous growth.

I. fulgens (glittering).* *fl.* clear orange-scarlet; corymbs dense, terminal. *l.* on short petioles, linear-lanceolate, acuminated. *h.* 3ft. to 4ft. Java, &c. A most desirable species. (B. M. 4525, under name of *I. salicifolia.*)

I. grandiflora (large-flowered). A synonym of *I. stricta.*

I. javanica (Java).* *fl.* orange; corymbs dense, on long peduncles, trichotomous. Summer. *l.* ovate-oblong, acuminated. *h.* 3ft. to 4ft. Java, 1846. Very distinct and desirable. (B. M. 4586.)

I. lanceolaria (lance-leaved). *fl.* greenish-white, rather lax, in terminal, pedunculate, trichotomously-branched corymbs. April. *l.* patent, often 9in. long, lanceolate, acuminate, somewhat coriaceous; nerves running parallel, and almost at right angles with midrib; stipules small, erect. *h.* 2ft. India, 1847. Stove. (B. M. 4399.)

I. laxiflora (loose-flowered). *fl.* very fragrant, small, handsome, in large, terminal, singularly trichotomous panicles; calyx deep red; corolla white, tinged with pink; tube 1½in. long, slender, cut to the base into four spreading segments. Summer. *l.*, largest 9in. long, oblong-lanceolate, acuminate, shortly petioled. *h.* 3ft. to 4ft. Upper Guinea. (B. M. 4482.)

I. macrothyrsa (large-thyrsed).* *fl.* deep red, becoming tinged with crimson as they get older, in immense trusses. *l.* ample, attaining 12in. in length, beautiful deep green. South Sea Islands, 1878. A fine plant. SYN. *I. Duffii* (under which name it is figured in Gn. April 5, 1879).

I. odorata (fragrant). *fl.* pure white, quickly changing to yellow-brown, deliciously fragrant, 4in. to 5in. in length, in large, terminal, much-divided panicles, 1ft. or more in diameter. May. *l.* fine dark green, opposite, ample, broadly-ovate or obovate-lanceolate, spreading, 6in. to 12in. long, acute or rather acuminate, entire, coriaceous; lower ones tapering to a footstalk; upper ones smaller, more ovate, sessile. *h.* 3ft. Madagascar, 1844. (B. M. 4191.)

I. picturata (painted). A distinct and handsome hybrid between *I. Williamsii* and *I. stricta*, having leaves and growth after the style of the former, with the fine compact corymb of flowers of the latter. 1880.

I. Pilgrimii (Pilgrim's).* *fl.* bright orange-scarlet, shaded with crimson; corymbs perfectly round, about 7in. in diameter. A hybrid from *I. Williamsii*, having the same fine constitution, and, like it, not requiring so much heat, by 10deg. to 15deg., as *I. coccinea*, and most others. It is one of the finest forms yet produced. 1880. (F. M. n. s. 428.)

I. princeps (chief).* *fl.* buff-white, changing to a deep reddish-orange, produced in the greatest profusion. *l.* 6in. to 7in. long, by 2in. wide. Java. A fine exhibition species.

I. profusa (profuse). *fl.* rosy-salmon colour, very freely produced, densely disposed in enormous corymbs. A handsome garden variety, admirably adapted for exhibition and general decorative purposes. 1882.

I. regina (queen).* *fl.* rich violet-salmon colour, disposed in large dense corymbs. *l.* ovate, acuminate. A very handsome and distinct garden variety, not unlike *I. Williamsii*, but dwarfer and more compact.

I. sanguinea (bloody). *fl.* crimson, shaded with deep violet, numerously disposed in large corymbs. A distinct garden variety, with ample deep green foliage.

I. splendens (splendid).* *fl.* bright coppery-scarlet, intensely brilliant; corolla tube 1½in. long; corymbs very large. *l.* elliptic-obtuse, 3½in. long, 1½in. wide. A handsome garden variety.

I. stricta (upright). *fl.* light orange; tube of corolla ¾in. to 1in. long; cymes many-flowered, decompound, crowded. Summer. *l.* firm, oval-lanceolate, much attenuated. *h.* 2ft. to 3ft. Moluccas and China, 1822. (B. R. 782, under name of *I. crocata.*)

I. s. rosea (rose-coloured). *fl.* pale pink, becoming reddish as they grow old, terminal, axillary, in large, round, lax, supra-decompound cymes; limb segments oblong-cuneate, acute. Summer. *l.* dark shining green, sub-sessile, oblong, acute, narrowed towards the base, with an obsolete sinus; under surface villous. *h.* 4ft. Bengal, 1819. (B. M. 2428.)

I. s. rutilans (ruddy). A much-improved garden form of the type, having larger and more compact heads of fine crimson-red flower tubes, and rich orange or salmon-red lobes. It has a free and vigorous style of growth. *I. s. Prince of Orange* is a fine variety, with cinnabar-red flowers, raised by Messrs. Veitch and Sons. (R. G. 1015.)

I. Thwaitesii (Thwaites'). *fl.* very compact, erect; corolla white or cream-colour, hypocrateriform; tube slender, 1¼in. long; limb spreading, ¾in. in diameter; corymb terminal, short-peduncled, trichotomous. May. *l.* sub-coriaceous, opposite, 3in. to 8in. long, 1in. to 4in. broad, broad-lanceolate, but variable, abruptly acuminate; petiole scarcely two lines long; stipules reddish. *h.* (in native country) 10ft. to 20ft. Ceylon, 1859. (B. M. 5197, under name of *I. jucunda.*)

I. undulata (wavy). *fl.* white; tube of corolla ½in. long; panicle terminal, compound, having its branches corymbose at the apex. Summer. *l.* elliptic or lanceolate, acuminated, undulated. *h.* 3ft. to 4ft. Bengal, &c., 1820.

I. Williamsi (Williams's).* *fl.* reddish-salmon, in large heads. A free-growing and profuse-flowering form, of garden origin.

JABOROSA (derived from the Arabic word *Jabarose*, which was applied to the Mandrake, from its affinity to that plant). ORD. *Solanaceæ.* A genus comprising six or seven species of pretty greenhouse or hardy herbaceous perennials, one of which is from Mexico and the rest from the Andes and extra-tropical South America. Flowers white or yellowish, solitary; corolla campanulate or tubular. Leaves dentate, runcinate-pinnatifid, or dissected. The species thrive in a light sandy-loam soil. Increased by divisions of the plant; or by seeds, sown during spring. Cuttings of young shoots will root under a handlight. The only species yet introduced to cultivation is the one here described.

J. integrifolia (entire-leaved). *fl.* white; corolla 2in. long, with acute segments; scapes length of petioles. *l.* petiolate, oval, nearly entire. *h.* 6in. Buenos Ayres. A pretty little hardy plant, forming a mass of deep green foliage; it thrives in a southern aspect. (B. M. 3489.)

JACARANDA (the name of one of the species in Brazil). SYNS. *Icaranda, Kordelestris.* ORD. *Bignoniaceæ.* A genus comprising about thirty species of ornamental stove shrubs and trees, somewhat resembling in habit the fine-leaved species of *Acacia.* Flowers blue or violet, showy, panicled, usually terminal; corolla tubular at the base, much dilated above, campanulate, ventricose beneath. Leaves opposite, bipinnate. *J. mimosifolia* is, probably, the best-known of the two or three species in cultivation. It thrives in a compost of sandy peat and fibry loam; plenty of drainage is most essential. Cuttings of half-ripened shoots will root, during the early summer months, in sand over sandy peat; they should be placed in heat, and kept shaded until well rooted. The same treatment will answer with the second species.

J. mimosifolia (Mimosa-leaved). *fl.* blue, drooping; panicles large, terminal, naked, erectly pyramidal; corolla silky. Early summer. *l.* about 1½ft. long, bipinnate, with many pairs of opposite pinnæ, each pinna bearing ten to twenty-eight pairs of trapezoid-oval-oblong, mucronate, downy leaflets. *h.* 10ft. Brazil, 1818. Shrub. (B. R. 631; B. M. 2327, under name of *J. ovalifolia.*)

J. tomentosa (downy). *fl.*, corolla dark purple, downy externally, with a short tube; limb tubular-campanulate, 1½in. long, with a pale spot under the upper lip. June. *l.* bipinnate, downy; leaflets with an odd one, ovate-rhomboid, acute, very unequal. *h.* 20ft. Mexico, 1824. Shrub. (B. R. 1103.)

JACINTH. A name for the Hyacinth.

JACK-IN-A-BOX. *See* **Hernandia.**

JACKSONIA (named after George Jackson, a Scotch botanist). ORD. *Leguminosæ.* A genus comprising about twenty-eight species of rigid, greenhouse, leafless, shrubs or sub-shrubs, all natives of Australia. Flowers yellow, mixed with purple, small, in lateral or terminal racemes or spikes, or scattered along the branches; bracts small, scale-like. Leaves replaced by very minute scales at the nodes. Branches rigid, terete, angular or winged. The species thrive in a peat and loam soil. Cuttings of half-ripened shoots will root in sand, under a hand glass, during April. Jacksonias are very rarely seen in cultivation.

J. scoparia (broom-like). *fl.* yellow, disposed in one-sided racemes, either terminal or from the upper nodes. Summer. Branches angular. *h.* 2ft. to 6ft. 1803. Plant arborescent, unarmed. This tree is known in New South Wales as Dogwood, on account of the offensive smell emitted by its wood when burning. (L. B. C. 427.)

JACK-TREE. A common name of **Artocarpus integrifolia** (which *see*).

JACOBINIA (derivation doubtful). Including *Cyrtanthera, Pachystachys, Sericographis.* ORD. *Acanthaceæ.* A genus comprising about thirty species of stove erect herbs or shrubs, natives of tropical America, from Brazil

Jacobinia—*continued.*

and Bolivia as far as Mexico. Flowers often yellow, red or golden, rarely pale or rose. Leaves opposite, entire. For culture, *see* **Justicia** (to which the genus is allied).

J. aurea (golden). This is the correct name of the plant described in this work under the name of *Cyrtanthera catalpæfolia.*

J. carnea (flesh-coloured). *fl.* flesh-coloured; thyrse compact; bracts and sepals ovate-lanceolate. August and September. *l.* on rather long petioles, ovate-acuminate. *h.* 6ft. Rio Janeiro, 1827. (B. M. 3383; B. R. 1397, under name of *Justicia carnea.*)

J. chrysostephana (golden-crowned). This is the correct name of the plant described in this work as *Cyrtanthera chrysostephana.*

J. coccinea (scarlet). *fl.* scarlet; spikes terminal; helmet lanceolate, reflexed at the end; stigma of two plates. February. *l.* elliptical. *h.* 5ft. South America, 1770. (B. M. 432, under name of *Justicia coccinea.*)

J. Ghiesbreghtiana (Ghiesbreght's).* *fl.* scarlet, in terminal panicles. Winter. *l.* bright green, glabrous, ovate-lanceolate, entire. *h.* 1ft. to 1½ft. Mexico, 1843. (R. G. 97b, under name of *Sericographis Ghiesbreghtiana.*) A very handsome winter-flowering decorative plant.

J. Lindeni (Linden's). *fl.* orange-yellow, disposed in showy terminal heads. *l.* oval-acuminate, glabrous. Stem smooth. Mexico, 1870. (R. H. 1870, 250, under name of *Justicia Lindeni.*)

JACOB'S LADDER. *See* **Polemonium cæruleum.**

JACQUEMONTIA (named after Victor Jacquemont, 1801-1832, a French naturalist, and traveller in the East Indies). Ord. *Convolvulaceæ.* This genus comprises about thirty-six species of stove twining or prostrate herbs or sub-shrubs, one being a native of tropical Africa, and the rest tropical American. Flowers blue, white, or rarely violet, sometimes loosely or densely cymose, sometimes capitate, rarely solitary or loosely racemose. Leaves entire, often cordate, rarely dentate or lobed. The species here described are, perhaps, the only ones yet introduced. For culture, *see* **Ipomœa.**

J. canescens (hoary). *fl.* blue, in dense-flowered pedunculate cymes; sepals oblong, obtuse. June and July. *l.* oblong-cordate, on long petioles. *h.* 6ft. Bogota, 1846. Plant downy, scabrous. (B. R. 1847, 27, under name of *Convolvulus canescens.*)

J. violacea (violet). *fl.* pale blue, sessile; peduncles umbelled, five-flowered. July to September. *l.* oblong-cordate, acuminate, sub-repand, smooth. *h.* 6ft. Mexico to Brazil, 1808. (B. M. 2151, under name of *Convolvulus pentanthus.*)

JACQUINIA (named in honour of Nicholas Joseph de Jacquin, 1727-1817, an eminent botanist, once Professor of Botany at Leyden). Ord. *Myrsineæ.* A genus comprising about five or six species of very pretty stove evergreen shrubs, natives of tropical America, allied to *Theophrasta.* Flowers white, yellow, or purplish, terminal, racemose, or solitary; corolla campanulate. Leaves scattered, obtuse or verticillate, quite entire, with revolute edges, crowded at the tops of the branches. The species thrive in a compost of sandy peat, to which may be added a small quantity of fibry loam. Increased, during summer, by cuttings of ripened shoots, placed in sand, in a moist bottom heat, and covered with a bell glass.

J. armillaris (bracelet). *fl.* white, racemose or rather corymbose. June. *l.* cuneate-spathulate or obovate-oblong, obtuse or retuse, sometimes mucronulate, nearly veinless; margins somewhat revolute. West Indies, &c., 1768. Shrub or tree. This species is known by the West Indian settlers as Bracelet-wood, the shiny brown and yellow seeds being made into bracelets.

J. aurantiaca (orange-flowered). *fl.* orange, racemose. April to September. *l.* obovate-lanceolate, acuminated, ending in a pungent point. Branches sub-verticillate. *h.* 3ft. to 6ft. Sandwich Isles, 1796. (B. M. 1639.)

JAGGED. Cut in a coarse manner.

JALTOMATA. A synonym of **Saracha** (which *see*).

JAMAICA EBONY. *See* **Brya Ebenus.**

JAMAICA PEPPER. A name given to Allspice, **Pimenta vulgaris** (which *see*).

JAMBOSA. Now included under **Eugenia** (which *see*).

JAMESIA (named after Dr. Edwin James, an American botanist, who first discovered the plant). Ord. *Saxifrageæ.* A monotypic genus, the species being a very pretty hardy shrub. It thrives well in any ordinary garden soil, if such is perfectly drained. Increased by seeds; or by cuttings of ripened shoots, placed in sandy loam.

J. americana (American). *fl.* white, about ½in. in diameter, disposed in terminal paniculate cymes. June. *l.* opposite, serrated. Rocky Mountains, Colorado, 1865. A very neat dwarf-growing plant. (B. M. 6142.)

JAMESIA (of Nees). A synonym of **Stephanomeria** (which *see*).

JAMESONIA (named after Dr. William Jameson, Professor of Botany at Quito). Ord. *Filices.* A monotypic genus. The species is a greenhouse fern. Sori oblong, placed on the flabbelate veins on the back of the pinnæ, remote from the edge. For culture, *see* **Ferns.**

J. imbricata (imbricated). *rhiz.* woody, creeping, black, tortuose. *sti.* wiry, slender, 3in. to 4in. long. *fronds* 6in. to 18in. long, two to three lines broad, pinnate; pinnæ close, roundish, often spreading horizontally; edge much incurved. Andes, from New Grenada to Peru.

JANIPHA. *See* **Manihot.**

JAPAN CEDAR. *See* **Cryptomeria.**

JAPAN MEDLAR. *See* **Photinia japonica.**

JASIONE (derived from a name applied by Theophrastus to the Convolvulus). Sheep's Scabious. Ord. *Campanulaceæ.* A genus (about twelve species have been described) of hardy herbaceous plants, from temperate Europe and the Mediterranean regions. Flowers collected into terminal bracteated heads; corolla blue, rarely white, deeply five-parted; anthers combined into a tube at the base. Leaves alternate, narrow. The species form very pretty little subjects for the rock garden. They thrive best in a somewhat sandy soil. The perennials are propagated by sowing seed during the autumn, and by divisions; the annuals by seeds, which require to be sown in March.

J. montana (mountain). *fl.* pale blue, sometimes white, disposed in globose heads; peduncles naked. Summer. *l.* lanceolate, undulated, hairy. Stem erect, simple. *h.* 6in. to 12in. Europe (Britain). Annual. (Sy. En. B. 683.) The sea-side form of this species (*littoralis*) is generally biennial.

J. perennis (perennial). *fl.* blue, pedicellate, disposed in large sub-globose heads; peduncles naked. Summer. *l.* rather hairy; radical ones obovate; cauline ones oblong-linear, flat. Stems erect, simple. *h.* 1ft. Western Europe, 1787. An elegant perennial. (B. M. 2198; B. R. 505.)

JASMINANTHES. A synonym of **Stephanotis** (which *see*).

JASMINE. *See* **Jasminum.**

JASMINEÆ. A tribe of **Oleaceæ** (which *see*).

JASMINUM (its Arabic name). Jasmine. One, and by far the most important, of the three genera forming the Tribe *Jasmineæ* of Ord. *Oleaceæ.* About 120 species have been described: they are stove, greenhouse, or hardy, evergreen or deciduous shrubs, usually of trailing habit. Flowers showy, often very fragrant; corolla white or yellow, salver-shaped. Leaves opposite or rarely alternate, trifoliolate, impari-pinnate, or simple. Jasminums are well-known and very popular plants, on account of their elegant habit, and the perfume emitted by the flowers of many species. They may all be propagated from cuttings of firm wood. The tender species should be inserted in sandy or peaty soil, and placed under a hand glass, in heat; the hardy sorts succeed in a similar inclosure, without heat. *J. gracillimum* is an excellent winter-flowering, stove or warm greenhouse plant, well adapted for cultivation in pots or hanging baskets. *J. Sambac* may be similarly treated, but its double form is of somewhat straggling growth, and does best when planted out and trained to a pillar. The flowers of these species are white, and highly fragrant. *J. grandiflorum* is a fine warm greenhouse species, and *J. nudiflorum*, *J. officinale*, and *J. revolutum* merit special notice for covering walls, arbours, &c., outside. Hardy Jasmines thrive in any fairly good garden soil; the stove and green-

Jasminum—*continued.*

house species succeed in a compost of about equal parts loam and peat.

J. auriculatum (auriculate). *fl.* white; corolla seven-parted. May to September. *l.* mostly simple, ovate, some trifoliolate; leaflets ovate, lateral ones small. *h.* 10ft. India to Mauritius, 1790. Stove climber. (B. R. 264.)

J. azoricum (Azores). *fl.* white; petals five, equal in length to the tube. Summer and autumn. *l.*, leaflets ovate and sub-cordate, undulated. Branches terete. Azores, 1724. Greenhouse shrubby twiner. (B. M. 1889.)

J. didymum (twin). *fl.* pure white, ⅛in. to ⅜in. long; cymes scattered along slender panicles, which usually much exceed the leaves, and are axillary or terminal on short branches. Winter. *l.* trifoliolate, very variable in size and form; leaflets oblong, ovate, or orbicular, rarely ovate-lanceolate and acute or acuminate, coriaceous and shining, acute or rounded at the base, usually feather-nerved, and also three-nerved at the base. Tropical Australia and the Pacific Islands. An elegant hothouse climber, usually glabrous and shining, but sometimes more or less pubescent, especially on the inflorescence. (B. M. 6349.)

FIG. 340. FLOWERING BRANCHLET OF JASMINUM FLORIDUM.

J. floridum (florid). *fl.* yellow, ½in. in diameter, in lax cymes; calyx teeth long, subulate. *l.* alternate, pinnately trifoliolate. Japan and China, 1884. A hardy ornamental shrub. See Fig. 340. (B. M. 6719.)

J. fruticans (shrubby). *fl.* yellow, with oblong, obtuse petals. Summer. *l.* alternate, ternate, and simple; leaflets [illegible] or cuneiform, obtuse. Branches angular. *h.* 10ft. to 12ft. South Europe, [illegible]. A hardy evergreen shrub. (B. M. 461.)

J. gracile (slender). A synonym of *J. simplicifolium*.

J. gracillimum (very slender).* *fl.* white, large, sweet-scented; petals nine, elliptic-oblong; panicle many-flowered, [illegible], drooping. Winter. *l.* opposite, petiolate, ovate-cordate, acute, [illegible]. Northern Borneo, [illegible]. A most desirable and elegant small-growing stove species, with long, slender branches. (B. M. [illegible].)

FIG. 341. FLOWERING SPRAY OF JASMINUM GRANDIFLORUM (reduced).

J. grandiflorum (large-flowered).* *fl.* white, reddish underneath. June to October. *l.* [illegible] three to five [illegible]. [illegible] tropical North-western [illegible]. [illegible] the tropics. [illegible]. A warm [illegible] very like *J.* [illegible], but differing in the equal size of the leaflets, and in the [illegible]; also in the larger flowers. See Fig. 341. (B. R. [illegible].)

J. hirsutum (hairy). A synonym of *J. pubescens*.

J. humile (humble). *fl.* yellow, with oblong, obtuse segments; peduncles terminal, twin, or tern, three-flowered. Summer. *l.* alternate, acute, trifoliolate or pinnate. Branches angular. *h.* 3ft. to 4ft. India, 1656. Hardy deciduous shrub. (B. R. 350.)

J. multiflorum (many-flowered). A synonym of *J. pubescens*.

FIG. 342. FLOWERING BRANCH OF JASMINUM NUDIFLORUM.

J. nudiflorum (naked-flowered).* *fl.* yellow, solitary, [illegible]. Winter. *l.* [illegible]. Branches [illegible]. [illegible], 1844. A well-known and most [illegible] hardy deciduous climber, producing its flowers in great abundance throughout the winter months. It thrives in almost any situation, and grows with great rapidity. See Fig. 342. (B. M. [illegible].)

J. odoratissimum [illegible]. *fl.* yellow, with five [illegible] obtuse segments; peduncles terminal, by threes, three-flowered. Summer. *l.* alternate, [illegible], ternate and pinnate. Branches terete. Madeira, [illegible]. Hardy climber. (B. M. [illegible].)

FIG. 343. SMALL INFLORESCENCE OF JASMINUM OFFICINALE.

Jasminum—*continued.*

J. officinale (official).* Common White Jessamine. *fl.* white, fragrant; corolla four or five-cleft. June to September. *l.* opposite, pinnate; leaflets ovate, acuminated, terminal one the longest. Branches angular. Northern India to Persia, 1548. See Fig. 343. Of this well-known and deservedly popular hardy climber, there are golden and silver-edged-leaved, and double-flowered varieties, which are, however, all inferior to the type. (B. M. 31.)

FIG. 344. INFLORESCENCE OF JASMINUM OFFICINALE AFFINE (natural size).

J. o. affine (related) differs from the type in more copious inflorescence, and larger flowers. Probably of garden origin. See Fig. 344. (R. H. 1878, 87.)

J. paniculatum (paniculate). *fl.* white, in terminal panicles. January. *l.* ternate, oval, obtusely acuminate. *h.* 5ft. China, 1818. Stove evergreen climber. (B. R. 690; L. B. C. 469.)

J. pubescens (downy). *fl.* pure white, large, fragrant; petals six to nine, lanceolate; umbels terminal, sessile. Summer. *l.* cordate, mucronate, tomentose beneath and on the petioles; upper ones forming an involucre round the umbel. China and India, 1759. Plant sarmentose, downy. Greenhouse straggling shrub. SYNS. *J. hirsutum* (B. M. 1991), *J. multiflorum* (A. B. R. 496.)

J. pubigerum (down-bearing). *fl.* yellow, with five or six obtuse petals; peduncles elongated, one-flowered, terminal, sub-corymbose, downy. Summer and autumn. *l.* alternate, pinnate; leaflets seven, ovate-lanceolate or oblong-acuminate, sessile, downy while young. North-west India, 1827. A nearly hardy evergreen climbing shrub, closely allied to *J. revolutum*, but with smaller flowers.

J. revolutum (revolute-leaved).* *fl.* bright yellow, very fragrant, with five obtuse petals; corymbs terminal, compound. May to October. *l.* alternate, pinnate; leaflets five to seven, ovate-lanceolate or elliptic, glabrous, on short petioles. India, 1812. A greenhouse or hardy evergreen climbing shrub. Botanically, a form of *J. humile*, but distinct for horticultural purposes. (B. M. 1731.)

J. Sambac (Sambac or Arabian).* *fl.* white, fragrant, usually disposed in small trichotomous cymes. *l.* almost sessile, membranous, from cordate to oblong, acute or obtuse, waved. India, 1665. A well-known and handsome evergreen stove twining shrub, producing flowers nearly all the year round. (B. R. 1.) There are two or three varieties, including a double-flowered form. (B. M. 1785.)

J. simplicifolium (simple-leaved). *fl.* white, terminal; corolla six to eight-parted; segments linear, acute, equal to the tube. June and July. *l.* oblong, polished. Australia, &c., 1800. Stove climber, or sometimes a tree. (B. M. 980.) SYN. *J. gracile* (B. R. 606).

J. undulatum (wavy). *fl.* white; cymes dense; calyx teeth subulate, pubescent. January. *l.* simple, cordate-oblong, shining. *h.* 5ft. India and China, 1819. Stove climber. (B. R. 436.)

JATEORHIZA (from *iatos*, healing, and *rhiza*, a root; in allusion to the medicinal qualities of the plant). ORD. *Menispermaceæ*. A genus comprising two or three species, natives of tropical Africa or Madagascar. The only one worthy of mention here is *J. Calumba*. For culture, *see* **Cocculus** (to which it is allied).

J. Calumba (Calumba). *fl.*, corolla pale green. *l.* alternate, the younger ones thin, pellucid, bright green, generally three-lobed, upwards gradually more numerous. Stems annual, herbaceous. Root perennial, consisting of a number of fasciculated, fusiform, somewhat branched, fleshy, curved, descending tubers. Mozambique. This plant furnishes the well-known Calumba-root, a drug much esteemed as a bitter tonic, where a stimulant or astringent effect is not required; it is often employed in cases of indigestion, dependent upon languor and want of tone in the stomach, and attended by nausea and flatulence. SYN. *J. palmata*. (B. M. 2970, under name of *Cocculus palmatus*.)

J. palmata (palmate). A synonym of *J. Calumba*.

JATROPHA (from *iatros*, physician, and *trophe*, food; in allusion to the medicinal qualities of the species). ORD. *Euphorbiaceæ*. A rather large genus (nearly seventy species) of tall stove herbs and shrubs, rarely trees (principally of economic value), widely distributed throughout warm regions, but most abundant in South America. Flowers in cymes. Leaves alternate, stipulate. Jatrophas thrive in a sandy-peat and fibry-loam compost. Cuttings of firm young shoots, dried before insertion, will strike in sandy soil, if placed in a brisk bottom heat.

J. integerrima (entire-leaved). *fl.* red; racemes sub-cymose. May to August. *l.* ovate, acuminate, indistinctly lobed at base, rather hairy. *h.* 3ft. Cuba, 1809. (B. M. 1464.)

J. multifida (many-cleft). *fl.* green. July. *l.* palmate, eleven-lobed, smooth; lobes pinnatifid, cuneate; stipules setaceous, multifid. *h.* 3ft. South America, 1696.

J. panduræfolia (fiddle-leaved). *fl.* scarlet. May to August. *l.* oblong, sub-panduriform, acuminate, entire, angular at base, with two teeth on each side. *h.* 4ft. Cuba, 1800. (B. M. 604.)

J. podagrica (gouty-stalked).* *fl.* orange-red; cymes on long peduncles, terminal; teeth of calyx and lobes of corolla blunt. Summer. *l.* peltate-cordate, five-lobed, glabrous; lobes sub-ovate, blunt; stipules glandularly fringed. Stem erect, branched, gouty at base. *h.* 1½ft. New Grenada, 1847. (B. M. 4376.)

J. urens (stinging). *fl.* slender. June to September. *l.* roundish-cordate, three to five-lobed; the divisions toothed, cut, or even pinnatifid, often discoloured. *h.* 2ft. to 4ft. Tropical America, 1880. (G. C. n. s., xiv. 753.)

JEFFERSONIA (named after T. Jefferson, 1743-1826, at one time President of the United States of America). ORD. *Berberideæ*. A genus comprising two species of hardy perennial herbs, the one from North America, the other from Mandschuria. Flowers white, solitary; scape naked. Leaves radical, and for the most part bilobed or bipartite. The species best known to cultivation is *J. diphylla*, a very desirable plant. It thrives in a sandy-peat soil, in the rockery or border, and in rather shady situations. Propagated by divisions; or by seeds, which should be sown so soon as ripe.

J. diphylla (two-leaved). *fl.* white, solitary, about 1in. across; petals eight; stamens yellow. Spring. *l.* profoundly cleft into two lobes. *h.* 3in. to 6in. Tennessee, 1792. (B. M. 1513.)

JENKINSIA. Now included under *Acrostichum*.

JENKINSONIA. Now included under **Pelargonium** (which *see*).

JERDONIA (named after Surgeon-Major T. C. Jerdon, an eminent ornithologist). ORD. *Gesneraceæ*. A monotypic genus, the species being a small stove herbaceous perennial. It thrives best in a sandy-loam soil, and in a moist atmosphere. Propagated by seeds, sown in bottom heat.

J. indica (Indian). *fl.*, rosy-lilac, small; corolla funnel-shaped, five-lobed; scape erect, terminal, bearing two or three flowers. Autumn. *l.* in a dense tuft, cordate, obtuse, petiolate, dark green, blotched with pale green along the ribs and principal veins. *h.* 3in. Neilgherri Mountains, 1870. (B. M. 5814.)

JERUSALEM ARTICHOKE. *See* **Artichoke, Jerusalem.**

JERUSALEM SAGE. *See* **Phlomis fruticosa.**

JERUSALEM THORN. *See* **Parkinsonia aculeata.**

JESSAMINE. *See* **Jasminum officinale.**

JOB'S TEARS. *See* **Coix.**

JOINT. In horticultural parlance, that portion of the stem from which a leaf is given off is called a Joint.

JOLIFFIA. A synonym of **Telfairia** (which *see*).

JONESIA. A synonym of **Saraca** (which *see*).

JONQUIL. *See* **Narcissus Jonquilla.**

JONQUILLA. Included under **Narcissus** (which *see*).

JOSEPHA AUGUSTA. *See* **Bougainvillea spectabilis.**

JOVELLANA. Included under *Calceolaria.*

JOVE'S FRUIT. *See* **Lindera melissæfolia.**

JUANULLOA (named conjointly after G. Juan and Antonio Ulloa, two Spaniards, who travelled in Peru and Chili). SYNS. *Laureria, Ulloa.* ORD. *Solanaceæ.* A genus comprising six or seven species of erect or epiphytal stove shrubs, natives of Peru, Columbia, and Central America. Flowers sometimes solitary or few, shortly pedicellate; sometimes several, loosely cymose; calyx large, inflated, coloured. Leaves entire, coriaceous. Juanulloas thrive in a rough peaty soil. Cuttings will root in sand, under a bell glass, in bottom heat. *J. parasitica* is the one best known to cultivation.

J. eximia (extraordinary). *fl.* green, in pairs, very large, drooping, between funnel and bell-shaped, about 6in. long. *l.* oval, firm, glossy, entire, shortly acuminate. Shrub. (B. M. 5092.) This plant really belongs to the genus *Dyssochroma.*

J. parasitica (parasitic).* *fl.* orange; racemes dichotomous, pendulous. May. *l.* oblong, acuminated, alternate, thickish. *h.* 3ft. Peru, 1840. (B. M. 4118.)

JUBÆA (named after Juba, a King of Numidia). Coquito Palm of Chili. ORD. *Palmeæ.* A monotypic genus, the species being a greenhouse palm. Flowers dark yellow, inclosed in a double spathe, and disposed in branching spikes. Fruit roundish, inclosing a hard one-seeded nut. Jubæa thrives best in a compost of one-half rich loam, and the remainder of leaf mould and sand. It is a very handsome plant, and is well adapted for sub-tropical gardening. Increased by seeds.

FIG. 345. JUBÆA SPECTABILIS.

J. spectabilis (remarkable).* *l.* pinnate, spreading, 6ft. to 12ft. long; pinnæ 1ft. to 1½ft. long, about 1in. wide, springing in pairs from nearly the same spot, and standing out in different directions; petioles very thick at the base, inclosed in a dense mass of rough brown fibres. Trunk, when developed, tall, straight, bearing the crown of large leaves. *h.* 40ft. to 60ft. Chili, 1843. The most southern of American palms. From the sap —obtained by felling the tree—boiled to the consistency of treacle, a syrup, called Palm-honey, is prepared, which is in considerable request in Chili. See Fig. 345. (G. C. n. s., xviii. 401.)

JUDAS-TREE. *See* **Cercis.**

JUGLANDEÆ. An order of trees or shrubs with watery or resinous juice, natives, for the most part, of North America. Male flowers in catkins; perianth two, three, or six-parted, with a scaly bract; female flowers in terminal clusters, or in loose racemes, with distinct or united bracts; perianth adherent, three to five-parted. Fruit a dry drupe, with a strong and often two-valved endocarp; seed exalbuminous, two to four-lobed at the base. Leaves alternate, pinnate, stipulate. The wood of several of the species of *Juglans* is much prized by cabinet makers; and the bark of *Juglans cinerea* is used as a purgative in America. There are about five genera and thirty species. Illustrative genera are: *Carya* and *Juglans.*

FIG. 346. CLUSTER OF FRUITS OF JUGLANS AILANTIFOLIA.

JUGLANS (the old Latin name used by Pliny, contracted from *Jovis Glans*, the Nut of Jupiter). Walnut. ORD. *Juglandeæ.* A genus of seven or eight species

FIG. 347. JUGLANS CINEREA, showing (1) Female Flower, (2) Fruits, and (3) Male Catkins.

Juglans—*continued.*

of hardy or half-hardy deciduous trees, widely dispersed over the temperate and sub-tropical regions of the Northern hemisphere. Flowers inconspicuous, deciduous; males in single catkins, and having a calyx of three to six irregular lobes; female flowers solitary, or a few in a group, terminal upon a shoot. Fruit having a fleshy, fibrous epicarp, bursting irregularly; endocarp two-valved, furrowed.

Juglans—*continued.*

in pendulous clusters, woolly. *l.*, leaflets sessile, truncate at the base, thin, soft, shortly toothed, green above, paler beneath. Origin uncertain. See Fig. 346.

J. cinerea (ashy-grey).* Butter Nut. *fl.* greenish. Spring. *fr.* oblong-ovate, with a tapered tip, downy, covered with viscid matter in small transparent glands, pendulous on a flexible peduncle. *l.*, leaflets fifteen to seventeen, lanceolate, rounded at the base, serrate, tomentose beneath; lateral ones sessile. *h.* 30ft. to 60ft. United States, 1656. See Fig. 347. (B. M. Pl. 247.)

FIG. 348. FRUITING BRANCH OF JUGLANS REGIA.

FIG. 350. FRUIT OF JUGLANS REGIA LONGIROSTRIS.

Leaves compound, alternate, exstipulate. The species thrive in almost any kind of fertile soil, provided the sub-soil be dry and the site moderately sheltered. For general culture, &c., see **Walnut**.

J. ailantifolia (Ailantus-leaved). *fl.* greenish, males in long, slender catkins. Spring. *fr.* violet-red when young, numerous,

J. nigra (black).* *fl.* greenish. Spring. *fr.* globose, roughish, with minute prominent points, situated upon a short inflexible peduncle. *l.*, leaflets thirteen to seventeen, cordate-acuminate, unequal at the base, serrated, somewhat downy. *h.* 60ft. United States, 1656. (W. D. B. ii. 158.)

J. regia (royal).* Common Walnut-tree. *fl.* greenish. Spring *fr.* with a green husk, oval, situated upon a short inflexible

FIG. 349. LEAF AND NUT OF JUGLANS REGIA ELONGATA.

Juglans—*continued.*

peduncle. *l.*, leaflets five to nine, oval, glabrous, obscurely serrated. *h.* 40ft. to 60ft. Persia, 1562. A well-known and desirable fruit. See Fig. 348. It has several varieties, for enumeration of which, and for culture, *see* **Walnut.**

J. r. Bartheriana (Barther's). A synonym of *J. r. elongata.*

J. r. elongata (elongated). This variety only differs in its very much elongated fruits. A nut (natural size) is represented at Fig. 349. SYN. *J. r. Bartheriana.*

J. r. longirostris (long-beaked). This is an extraordinary seminal variety of the common Walnut, distinguished by its long-beaked fruits. See Fig. 350.

JUJUBE. *See* **Zizyphus Jujuba.**

JULIANA. A synonym of **Choisya** (which *see*).

JULUS. *See* **Millipedes.**

JUNCEÆ. A natural order, containing about 130 species of perennial, rarely annual, herbs, principally natives of temperate and Arctic regions. Flowers green or brown, in axillary or terminal cymes, regular, hermaphrodite or diœcious, bracteolate; perianth inferior, scarious or coriaceous, the six segments in two series, the inner series sometimes petaloid, sometimes both series large and coloured; stamens six, rarely three only. Leaves slender, flat or terete, or reduced to sheathing scales. Stems erect, usually simple, sometimes septate within; pith often thick, continuous or interrupted. There are fourteen genera; *Juncus* and *Luzula* represent the order in the British Flora. The more important of the exotic genera are: *Calectasia*, *Kingia*, *Xanthorrhœa*, and *Xerotes*.

JUNCUS (from *jungo*, to join; the leaves and stems of this genus having been employed as cordage). Rush. ORD. *Junceæ*. A genus of about a hundred species of hardy herbaceous annuals or perennials, usually with a rigid habit, principally natives of Arctic and temperate regions. Flowers greenish or brownish, small, disposed in heads or panicles. Very few species of this genus are worth cultivating. The perennials thrive in almost any boggy situation, and may easily be increased by divisions of the root.

J. effusus spiralis (wide-spread spiral). A curious and desirable variety, forming spreading tufts of stems, which, instead of growing straight, like those of other kinds, are curiously twisted in a regular corkscrew form. From its very unusual appearance, it is well worthy of cultivation, and may be planted with advantage on the margins of pieces of water, near cascades, &c., or in an artificial bog.

J. lætevirens (bright-green).* *l.* bright green, in crowded tufts, somewhat distichously sheathing at the base, and distinctly compressed at the sides. *h.* 3ft. Japan, 1880. A free-growing and exceedingly ornamental hardy plant. This is probably not a Juncus at all.

J. zebrinus. *See* **Scirpus Tabernæmontani zebrinus.**

JUNE BERRY. An American name for *Amelanchier.*

JUNIPER. *See* **Juniperus.**

JUNIPER MOTH (*Thera juniperata*). One of a small genus of slender-bodied moths, of the group called Geometers, because of the peculiar looping movements of their caterpillars. All the species of *Thera* feed on Conifers; *T. juniperata* and *T. coniferata* on Juniper, *T. variata* and *T. firmata* on Scotch Fir. The insects are common in many parts of Britain, where their food-plants occur; but they seldom cause serious damage to either Junipers or Firs. The moths are all between ¾in. and 1¼in. in spread of wings, and are very much alike. In all, the wings are rather large in proportion to the slender body, and are grey or greyish-brown, with a broad darker band across the front wings. Both the species that feed on Juniper are about 1in., or a little less, across the wings. In *T. juniperata*, the front wings are pale grey, with a dark grey band, which is bounded on each side by a very zigzag line, and there is a dark streak close to the tip of the wing. *T. coniferata* has the front wings greyish-brown, with the lines bounding the cross-band much less zigzag. The insects

Juniper Moth—*continued.*

that live on the Fir are slightly larger. *T. firmata* has the front wings pale grey, with an indistinct ochreous-brown band; and *T. variata* has them greyish-brown, with the inner margin of the band not so straight as in *T. coniferata*. The caterpillars of all four species are green, marked with lemon-yellow or white lines (usually three) down the back and sides. The pupæ are usually green, and are inclosed in a silken cocoon, either suspended among the twigs of the food-plant, or among rubbish on the ground. *T. juniperata* flies in October; the other species appear from July to September. Should it be desirable to reduce their numbers, this may be done, in some degree, by shaking the branches, and by the removal of dead twigs, as well as of all rubbish from below the bushes.

JUNIPERUS (the old Latin name used by Virgil and Pliny). Juniper. ORD. *Coniferæ*. A genus of about twenty-seven species of hardy or nearly hardy evergreen trees or shrubs, natives of the temperate or cold regions of the Northern hemisphere. Flowers diœcious; males in solitary or crowded catkins. Cones small, globose, baccate, of four to six decussate or whorled, confluent, fleshy scales. Fruit berry-like, ripening the second year. Leaves needle-shaped, linear or lanceolate, rigid or flexible, or scale-like, scattered or imbricated, not clustered. *J. communis*, the species most commonly grown, thrives in almost any position. On the sides of hills, the trunk grows long; while on the tops of rocky mountains, or in boggy land, the species becomes merely a tufted shrub. All the members of this genus may be readily propagated by seeds, which retain their vitality, when kept in the berry, for several years. When sown, they lie one year, and often two years, before they come up. Propagation may also be effected by cuttings, planted in sandy soil, in a shady situation, in the autumn, and covered with a hand glass during winter; or by layers.

J. bermudiana (Bermuda). Barbados or Bermuda Cedar. *l.* dimorphous, acicular, and arranged in threes on the young plants, but becoming scale-like and imbricated as the tree becomes aged. *h.* 40ft. to 50ft. Bermudas, 1683. A somewhat tender species, assuming a densely-branched pyramidal form in its native country. This tree furnishes the wood used in the manufacture of "cedar" pencils. It is very rarely seen in England. (G. C. n. s., xix. 657.)

FIG. 351. FRUITING TWIG OF JUNIPERUS CALIFORNICA; also LONGITUDINAL SECTION OF FRUIT, showing (*a*) Fleshy Portion, (*b*) Seed, and (*c*) Embryo.

J. californica (Californian). *l.* ternate, short and thick, mostly acute. *fr.* reddish, dry and sweetish. Branches stout, spreading, with thick branchlets. Shrub, or sometimes a tree from 20ft. to 35ft. See Fig. 351.

Juniperus—*continued.*

J. chinensis (Chinese).* *l.* ternate or opposite, linear, flat, acute, and spreading, or small, scale-like, and closely imbricated. China, 1804. A very handsome shrub or tree, of erect or elongated pyramidal habit, with short branches and dimorphous foliage. The female and male plants are distinct, both in habit and aspect. The male is the more desirable, and is much more generally grown; it has numerous branches, the higher ones ascending, or nearly erect, and all very much ramified. The female plant has the branches longer, more distant, and more spreading, than those of the male; the small berries are of a brownish-violet colour. (S. Z. F. J. ii. 126, 127.) The varieties of this species are numerous.

J. c. albo-variegata (white-variegated). A pretty form, differing from the male type in having the foliage interspersed with silvery-white among the ordinary green growth, and in having many of the terminal shoots pure white. Japan.

J. c. aurea (golden). A very beautiful and distinct form, of garden origin, differing from the type in being suffused with bright gold, which it retains all the year round, and which is heightened by full exposure to the sun.

J. c. densata (dense). According to Messrs. R. Smith and Co., this is a female form, and has somewhat the appearance of the species, but the leaves are larger and more plentiful. The main stem grows upright, and all the branchlets, which are very numerous, are more or less pendulous. This variety forms a dense pyramidal growth, and is very ornamental. *h.* 10ft. to 20ft. Himalayas.

J. c. japonica (Japanese).* *l.* arranged in threes, close set, at first acicular, but ultimately scale-like, distinctly marked with two silvery glaucous lines above. Stem usually divided, but sometimes single. *h.* 2ft. Japan and North China. A small and compact-growing shrub, very desirable for rockwork.

J. c. j. aurea (golden). A very loose-growing form, having the growth of the current season tinged with golden-yellow, which gradually changes to light green. Primary branches few, robust, and comparatively long

FIG. 352. JUNIPERUS COMMUNIS HIBERNICA, showing Habit, Fruiting Branchlet, and Young Female Cone.

Two other forms, described by Smith, are: *glauca* (glaucous), a very distinct form, having the foliage of a glaucous or bluish tint; and *Leeana* (Lee's), which has leaves about ½in. long, and forms a densely-branched and vigorous-growing shrub.

J. communis (common).* Common Juniper. *l.* subulate, rigid, sharp-pointed, spreading, and opposite, or in threes, usually glaucous above and green below. *h.* 3ft. to 20ft., varying according to the elevation at which it is found. Northern hemisphere (Britain). Well-grown specimens of this species, nicely furnished with branches, are most desirable plants. The wood is finely-veined, of a yellowish brown colour, and has an aromatic scent. The varieties of it are, for the most part, well worth growing. The following call for special mention:

J. c. canadensis (Canadian). A dwarf spreading bush of inelegant habit, seldom exceeding 3ft. in height. Northern United States, &c., 1820.

J. c. compressa (compressed). A very compact-growing variety, having a conical form, and slender, erect branches and branchlets, which grow close together. *h.* 1ft. to 3ft. This is one of the smallest of Conifers; the very diminutive size of the plant rendering it interesting. It is found on the Pyrenees at a great elevation.

J. c. cracovia (Cracow). Polish Juniper. An erect, robust-growing variety, well-clothed with leaves, and sometimes having the terminal branchlets pendulous. *h.* 12ft. to 15ft. Poland.

J. c. fastigiata (pyramidal). Swedish Juniper. A more erect-growing form than the type, and somewhat resembling the Irish Juniper, but more robust in growth, and with foliage more glaucous, and of a light green. In habit, it is either columnar or angular, and is not usually considered very ornamental. SYN. *J. c. suecica.*

J. c. hemisphærica (half globe-headed). *l.* short, rigid, needle-shaped, in threes, glaucous. South Europe. A curious and interesting little shrub, with a dense rounded habit. SYN. *J. echiniformis.*

J. c. hibernica (Irish).* Irish Juniper. A well-known and desirable variety, with a somewhat columnar habit of growth, and a peculiar silvery-glaucous appearance; the branches are erect, with numerous, rigid, close-set branchlets. It is the handsomest of all the varieties of *J. communis*, and thrives best on cool clay or peat soils. SYN. *J. stricta.* See Fig. 352. There is a form with prettily-variegated leaves.

J. c. nana (dwarf). A pretty dwarf procumbent shrub, with short branches and branchlets, covered with shorter, broader, imbricated, incurved leaves, glaucous above and green beneath. Alpine parts of Europe, &c. SYN. *J. nana.*

J. c. oblonga (oblong-fruited). A procumbent shrub, with slender branches and branchlets, clothed with long, attenuated leaves, which are of a deeper and brighter colour than the type. Caucasus. This variety rarely thrives well in England. It is very distinct as regards the colour of its foliage, and it sometimes takes an erect habit. SYN. *J. oblonga.*

J. c. suecica (Swedish). A synonym of *J. c. fastigiata.*

FIG. 353. FRUITING BRANCHLET OF JUNIPERUS DRUPACEA.

J. drupacea (drupe-fruited).* *l.* in threes, broader and stouter than those of any other species, very sharp-pointed, and light green. The fruits of this species are remarkable, both in size and colour; they are of deep purple, covered with a glaucous bloom, and are about the size of the common sloe. Branches numerous, short, imparting a columnar or elongated conical form to the tree. Trunk straight, erect. *h.* 8ft. to 10ft. Northern Syria, &c., 1854. This is a very handsome and distinct species, and is particularly ornamental as a plant for lawns. See Fig. 353.

J. dumosa (brambly). A synonym of *J. recurva squamata.*

J. echiniformis (hedgehog-like). A synonym of *J. communis hemisphærica.*

J. excelsa (tall).* *l.* opposite or (rarely) in threes, thick, decurrent, loosely imbricated, having a greyish-green hue. Branches short, much ramified. *h.* 20ft. to 40ft. Asia Minor, 1806. A compact-growing and very distinct ornamental tree, having a pyramidal shape; it is somewhat tender, but forms handsome specimens in sheltered situations. The varieties are not numerous.

J. e. stricta (upright).* This variety differs from the type principally in having a more tapering outline and more glaucous

Juniperus—*continued.*

foliage. It is an extremely pretty species, of garden origin, and well deserves cultivation.

J. Fortunei (Fortune's). A synonym of *J. sphærica.*

J. fragrans (fragrant). A synonym of *J. occidentalis.*

J. macrocarpa (large-fruited). A shrub of more open and spreading habit than the common Juniper; it has also longer leaves, and, as its name implies, bears larger berries. It is rarely other than an inelegant bush in British gardens. *h.* 10ft. to 12ft. Mediterranean region.

J. nana (dwarf). A synonym of *J. communis nana.*

J. neoboriensis (Naumberg). *l.* short, rigid, very glaucous. A very distinct species, with a pyramidal or fastigiate habit, and short branches; probably of garden origin. According to Messrs. Veitch, the Juniper cultivated in British gardens under this name is evidently a variety of *J. communis.*

J. nepalensis (Nepaul). A synonym of *J. recurva.*

J. oblonga (oblong). A synonym of *J. communis oblonga.*

J. occidentalis (Western).* *l.* in whorls of three; when young, spreading, sharp-pointed, glaucous; but when in an adult state, short, blunt, imbricated, and closely appressed to the stem. Berries small, deep purple, covered with a glaucous bloom. *h.* 10ft. to 50ft. California. A conical, erect-growing species, of a peculiar colour. When bruised, its branches emit a very strong scent. It is a very handsome plant for lawns. SYN. *J. fragrans.*

J. o. Burkei (Burke's). A desirable variety, of neat, compact habit, and of a more decided blue-glaucous tint than the type.

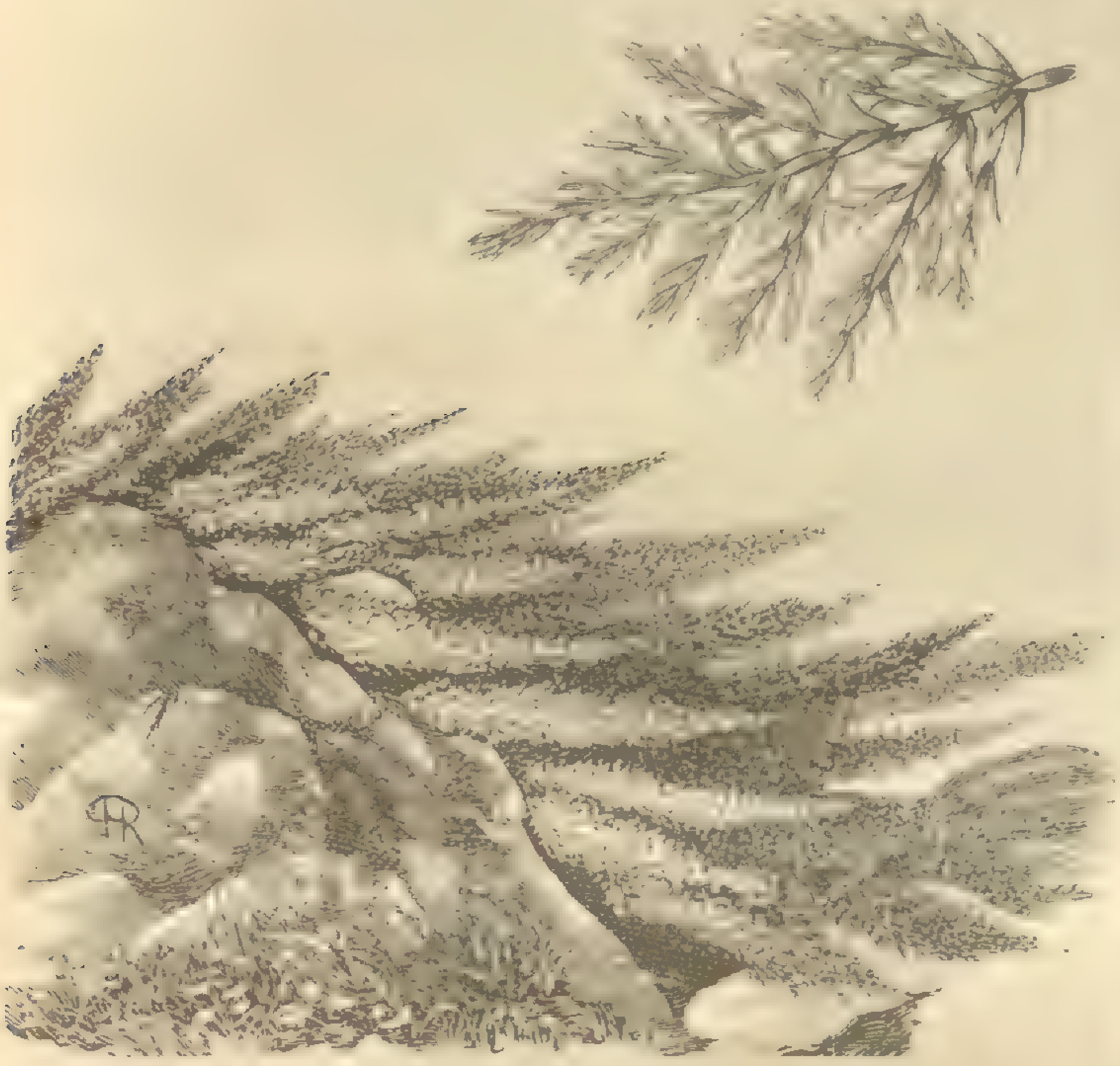


FIG. 354. JUNIPERUS SABINA, showing Habit and detached Portion of Branch.

J. oxycedrus (sharp-Cedar). *l.* sharp, spreading, needle-like, in whorls of three. *h.* 10ft. to 12ft. Spain, Portugal, &c., 1739. A large, bushy, much-branched shrub, with slender pendulous branches. This species may be distinguished from the common Juniper by its somewhat broader and shorter leaves, with more prominent white bands on the under side. In Great Britain, owing to climacteric causes, it attains but small proportions, has an inelegant habit, and is quite destitute of any ornamental qualities. SYN. *J. rufescens.*

J. pachyphlœa (thick-barked). *l.* subulate, almost squamiform, closely imbricated, thick and broad at the base, sharp-pointed. A slender, upright tree, with a whitish appearance, a tapering habit, and short, erect branches. New Mexico. A remarkable, but scarcely handsome species.

J. phœnicea (Phœnician).* *l.* small, scale-like, in threes, imbricated, scarcely glaucous. *h.* 15ft. to 18ft. Mediterranean region, 1683. A large pyramidal shrub, with a profusion of slender pendulous branches, growing in tufts. It is a handsome plant for growing near water, or on rockwork, in almost any situation.

J. p. lycia (Lycian). This form is described as being a creeping shrub. It is interesting, from producing the resinous gum known as Olibanum, which is used as incense in religious ceremonies on the Continent. (A. F. B. iv. 2367.)

J. procumbens (procumbent).* A glaucous creeping species, having a spreading habit, and never rising more than a few inches from the ground. It closely resembles *J. Sabina* in the colour of its foliage, but the young growth is more glaucescent. It is a very ornamental plant for rockwork. Canada and Northern United States. SYNS. *J. prostrata* and *J. repens.*

J. prostrata (prostrate). A synonym of *J. procumbens.*

J. recurva (recurved). *l.* loosely imbricated, sharp-pointed, usually in whorls of three, greyish-green. Branchlets recurved, pendulous, feathery. *h.* 5ft. to 8ft. Nepaul, 1817. A graceful and handsome plant when healthy, but liable to attacks of Red Spider. It should be grown in a cool soil. The male form, usually called *densa*, is much shorter in foliage, and very much dwarfer in habit, than the female form. SYNS. *J. nepalensis* and *J. repanda.* (G. C. n. s., xix. 468.)

J. r. squamata (scaly-leaved). *l.* rigid, sharp-pointed, scaly, usually in threes, glaucescent. Branches with numerous short stiff branchlets. A large creeping shrub, with a much-branching and spreading habit, and rather more peculiar than ornamental. *h.* 3ft. Nepaul, 1824. SYN. *J. dumosa.*

J. repanda (repand). A synonym of *J. recurva.*

J. repens (creeping). A synonym of *J. procumbens.*

J. rigida (stiff-leaved). *l.* very distinct, about ½in. long, linear, rigid, erect, sharp-pointed, produced in whorls of three, marked with a glaucous furrow on the upper side. Branches drooping; when young, slender, and of a lively green, slightly tinged with yellow. *h.* 15ft. Japan, 1861. An ornamental species, with an upright and somewhat irregular habit. (S. Z. F. J. ii. 125.)

J. rufescens (reddish-berried). A synonym of *J. oxycedrus.*

J. Sabina.* Common Savin. *l.* small, scale-like, imbricated, somewhat acute. *h.* 5ft. to 8ft. South Europe, 1548. An ornamental much-branched shrub, having a spreading, irregular habit, and with numerous reclinate or trailing branches. It thrives best in a light soil, and in airy situations. See Fig. 354.

J. S. tamariscifolia (Tamarisk-leaved).* A very ornamental low-growing, densely-branched, and trailing species. It has a neater habit than the type, and its foliage is of a brighter green. An excellent plant for rockwork, banks, &c. This variety is sometimes known as the Carpet Juniper. SYN. *J. sabinoides.* (Enc. T. & S. 2022.)

J. S. variegata (variegated). A very distinct and pretty variegated form, having its branchlets creamy-white or pale yellow. It should not be grown in too sunny a position.

J. sabinoides (Sabina-like). A synonym of *J. Sabina tamariscifolia.*

J. Sheppardi glauca (Sheppard's glaucous). A synonym of *J. sphærica Sheppardi.*

J. sphærica (globular-fruited). *l.* scale-like, imbricated. Berries of a globular or spherical form. North China, 1846. This species "combines the upright mode of growth of *J. chinensis* with the habit of *J. phœnicea* in its much-divided tufted branches and scale-like leaves; the colour of the foliage being, on the whole, brighter than the latter, and less glaucescent than the former. It shows the same peculiarity as *J. phœnicea*, in often departing from the diœcious character of the Juniper, so that particular branches are sometimes found loaded with berries, while the remainder of the plant has none" (Veitch's "Manual of the Coniferæ"). SYN. *J. Fortunei.*

J. s. Sheppardi (Sheppard's). *l.* acicular, rigid, not imbricated, sharp-pointed, assuming in autumn, and with the young growth, a very glaucous or almost silvery whiteness. It is a very pretty shrub, and has a rather spreading habit. China. SYN. *J. Sheppardi glauca.*

J. stricta (upright). A synonym of *J. communis hibernica.*

J. thurifera (incense-bearing).* Frankincense Juniper. *l.* subulate, imbricated, in opposite pairs, light glaucous-green. Branches slender, numerous, much divided, densely clothed with leaves. *h.* 15ft. to [illegible]. South-west Europe, 1752. (A. F. B. iv. [illegible].) A very ornamental, small, pyramidal tree, with an erect, slender, tapering trunk.

J. virginiana (Virginian).* Red Cedar. *l.* usually subulate and spreading in young plants, and very minute, scale-like, and closely imbricated. Branches at first erect, but ultimately usually decumbent, having numerous crowded branchlets. Trunk erect, of varying shades. *h.* [illegible] to [illegible], towards its Western limits, often a large tree, 60ft. to 90ft. high. United States, [illegible]. A well-known ornamental tree, usually of pyramidal form, and having beautiful bright red heart-wood. Its timber has an aromatic fragrance, and is largely employed in the manufacture of various utensils in its native country. The varieties of this species are somewhat numerous.

J. v. alba variegata (white-variegated). A form having a portion of the leaves white, and the remainder of greenish-yellow.

J. v. aurea-variegata (golden-variegated). A variable form, sometimes having the terminal branches and branchlets deep yellow, while at others the variegation is but a spot. It should be grown in a shady situation.

J. v. Bedfordiana (Bedford's). A handsome form, having the branches longer and more slender than the type; ultimate branches filiform, pendulous.

J. v. dumosa (bushy). A dwarf form, having a roundish, spreading, compact head. It resembles *J. Sabina tamariscifolia.*

Juniperus—*continued.*

J. v. elegans (elegant). A handsome free-growing variety, the entire plant being suffused with cream-coloured spots, which it retains throughout the winter and summer.

J. v. glauca (silvery). Silver Cedar. A very handsome variety, having a whitish appearance when making growth. It has a pretty cone-shaped habit, and is thickly branched from the ground upwards.

J. v. humilis (dwarf). A distinct and attractive variety, having the shoots branching out in a remarkable angular form.

J. v. pendula (pendulous). Weeping Red Cedar. According to Gordon ("Pinetum"), "there are three forms of the pendulous Red Cedar to be found in collections; one of the male form, another the female, and the third a *bright green* one. The male kind has shorter and much more numerous branchlets, while the female one has longer, more slender, and much fewer branchlets; the third variety is of a light glossy green." The female form is superior to the others.

J. v. Schotti (Schott's). A distinct variety, of pyramidal habit, and distinguished by its peculiar light green foliage.

J. v. tripartita (three-parted). A very pretty dwarf spreading variety, somewhat resembling *J. Sabina* in habit, but much denser.

JUPITER'S BEARD. *See* **Anthyllis Barba-Jovis.**

JURINEA (derivation not explained). ORD. *Compositæ.* A genus containing about forty species of hardy herbaceous perennials, natives of South Europe, Western and Central Asia, and distinguished from allied genera in the four-sided, somewhat top-shaped achenes being crowned with a pappus of unequal rough hairs. None of the species introduced are of much horticultural value, although occasionally seen in gardens. They thrive in any ordinary garden soil. Increased by seeds, or by divisions of the roots, in spring.

J. depressa (depressed). *fl.-heads* purple. June. *l.* stalked, lyrate, pale green above, canescent beneath; the terminal segment large, rounded; the lateral ones small, ovate or triangular, entire. *h.* 6in. Caucasus, 1837.

J. spectabilis (showy). *fl.-heads* purple. June. *l.* pinnatifid; lobes oblong, obtuse, angulate, white tomentose underneath. *h.* 1ft. Caucasus, 1837.

JUSSIÆA (named in honour of the celebrated family of Jussieu). SYN. *Jussieua.* ORD. *Onagrarieæ.* A genus comprising about thirty species of stove or greenhouse herbs, or rarely shrubs, very rarely small trees, often marsh-loving, and a few aquatic; they extend over the tropical regions of the globe, but are mostly found in America. Flowers white or yellow, axillary, solitary, very short or long-stalked; calyx with an elongated tube, and four to six persistent lobes; petals four to six, spreading. Leaves alternate, very frequently membranaceous and entire, rarely coriaceous and serrated. All the species thrive in a loamy soil, the aquatics requiring a basin of water. Propagation may be effected either by seeds or by divisions.

J. frutescens (shrubby). *fl.* yellow, shortly pedicellate; calyx lobes four, ovate, acute, pubescent outside; tube cylindrical, eight-furrowed. June. *l.* sessile, lanceolate-linear, glandulose, slightly crenate. 1824. Stove evergreen shrub.

J. ovalifolia (oval-leaved). *fl.* sessile; calyx lobes four, ovate, acuminate, three-nerved; petals orbiculate, nearly equal; tube elongated, tetragonal. *l.* sub-sessile, elliptic, acuminate, nerve-veined. Madagascar. (B. M. 2530.)

J. repens grandiflora (creeping, large-flowered). *fl.* yellow, 2in. in diameter, drooping before expansion; petals twice as long as the five calyx segments. May to August. *l.* lanceolate, acute. Stem creeping at base, 2ft. to 3ft. long. North America (in marshes), 1812. Greenhouse herb. (B. M. 2122.)

JUSSIEUA. A synonym of **Jussiæa** (which *see*).

JUSTICIA (named after J. Justice, a Scotch horticulturist). SYNS. *Adhatoda* (in part), *Athlianthus*, and *Tyloglossa.* ORD. *Acanthaceæ.* A large and much-confused genus, comprising about 100 species of herbs and sub-shrubs, occurring in tropical and sub-tropical regions, chiefly in India and Southern Africa. Flowers white, violet, pink, or rarely red. Leaves entire. Justicias are mostly of easy culture, and thrive in a compost of about equal parts of loam and leaf soil. Propagated by cuttings, inserted preferably in single pots, in spring, and placed in a close, warm frame. Young plants should be pinched, to encourage a bushy growth. They may be cultivated in frames all the summer, but require a stove or warm greenhouse temperature in winter.

Justicia—*continued.*

J. flavicoma (yellow-haired). *See* **Schaueria flavicoma.**

J. Gendarussa (Gendarussa). *fl.* lilac, whorled; spikes terminal, leafy. June and July. *l.* elongated. *h.* 3ft. India, 1800. (B. R. 635.)

J. Lindeni. *See* **Jacobinia Lindeni.**

J. marmorata (marbled). *l.* light shining green, blotched and marbled with white, about 10in. long and 4in. broad. A distinct and useful decorative plant.

J. pedunculosa. *See* **Dianthera americana.**

J. peruviana (Peruvian). *fl.* pale violet, large, in clusters in the axils; lower lip reticulated with white veins. Autumn. *l.* opposite, on footstalks, ovate-lanceolate, veiny, smooth beneath, hairy above. Stem 2½ft. high, pubescent, branched. Peru. (B. M. 430.)

J. secunda. *See* **Dianthera secunda.**

J. speciosa *See* **Peristrophe speciosa.**

J. ventricosa (swollen). *fl.* pink; spikes terminal; tube of corolla a little swollen upwards. June and July. *l.* oblong-ovate, entire, glabrous. *h.* 3ft. India and China, 1826. (B. M. 2766.)

KADSURA (its Japanese name). SYN. *Sarcocarpon.* ORD. *Magnoliaceæ.* A genus comprising about seven species of half-hardy climbing shrubs, natives of the mountains of Eastern tropical Asia. Flowers whitish or reddish, axillary or solitary. Leaves coriaceous, rarely membranaceous. Only one species is in general cultivation; it thrives in almost any soil, if grown against a wall. Cuttings of nearly ripened shoots will root in sand, under a bell glass.

K. japonica (Japanese). *fl.* white; peduncles opposite the leaves, one-flowered, usually solitary, longer than the petioles. June to September. *l.* oval or oblong-oval, acute at both ends, serrated, smooth, thick. Japan, 1846. Half-hardy shrub. (S. Z. F. J. 17.) There is a very pretty variegated form of this species.

KÆMPFERIA (named after E. Kæmpfer, 1651-1716, a German naturalist). Including *Cienkowskia* and *Monolophus.* ORD. *Scitamineæ.* A genus comprising about eighteen species of ornamental stove herbaceous perennials, natives of tropical Africa and Asia. Flower-spikes on leafy stems, or on radical, scaly, terminal scapes; corolla tube elongated, exserted; lobes lanceolate, acute, equal, spreading or reflexed. Leaves small, or rather large, generally elliptic or ovate-lanceolate, acuminate. Kæmpferias thrive in well-drained fibry loam and peat. During the growing season, they require an abundant supply of water; but when the leaves turn yellow, this should be almost entirely withheld, and the pots stowed away under staging, where no drip can reach them. When growth recommences, the plants should be shaken out and repotted.

K. Galanga (Galangale). *fl.* white, purple; external laciniæ of corolla lanceolate-linear; lower inner lacinia divided into two obovate segments. August. *l.* ovate, sessile. *h.* 1ft. Cochin China, 1728. (B. M. 850.)

K. Gilbertii (Gilbert's).* *l.* tufted, oblong-lanceolate, deep green; margin slightly undulated, and bordered by a broad and very conspicuous band of white. Moulmein, 1882. A very attractive and desirable variegated plant. See Fig. 355, for which we are indebted to Mr. Wm. Bull. (G. C. n. s., xvii. 713.)

K. ornata (adorned).* *fl.* yellow; disk orange. Summer. *l.* long-stalked, acute-lanceolate, shining deep green above with a broad silvery central band, purple beneath. Borneo, 1883. A handsome foliage plant. (I. H. 1884, 159.)

K. Parishii (Parish's). *fl.* white, bright violet-purple. July. *l.* lanceolate, erect, pale green. *h.* 1ft. Moulmein, 1867. (B. M. 5763.)

K. Roscoeana (Roscoe's). *fl.* white, few, fascicled, erect, sessile; segments obovate-obtuse. October. *l.* sub-orbiculate, acute, variegated above. *h.* 6in. Burmah, 1827. Plant stemless. (B. M. 5600.)

K. rotunda (round). *fl.* white, reddish-violet, large, fragrant. July to August. *l.* oblong, coloured beneath. *h.* 1ft. India, 1764. (B. M. 920, 6054.)

KAGENECKIA (named after Frederick de Kageneck, an ambassador from Holland to Spain). ORD. *Rosaceæ*. A genus of three or four species of half-hardy evergreen trees, natives of Chili and Peru. Flowers unisexual, terminal, racemose or corymbose, solitary. Leaves scattered, petiolate, serrated, thick, coriaceous; stipules small. The species thrive in a compost of loam, peat, and sand. Ripened cuttings will root, in sand, under a bell glass.

Kageneckia—*continued.*

K. cratægoides (Hawthorn-like). *fl.* white, in axillary racemes. June. *l.* oval-lanceolate, smooth, glaucous. *h.* 10ft. Chili, 1830. (B. R. 1836.)

K. oblonga (oblong). *fl.* white, solitary. August to December. *l.* oblong, obtuse, coriaceous, serrulated. *h.* 30ft. Chili, 1830.

FIG. 355. KÆMPFERIA GILBERTII.

KALANCHOE (Chinese name of one of the species). SYNS. *Calanchoe*, *Vereia*. ORD. *Crassulaceæ*. A genus of about a score species of erect, robust, stove or greenhouse herbs or shrubs, natives of tropical Asia, tropical and

Kalanchoe—*continued.*

Southern Africa, and one from Brazil. Flowers yellow, purple, or scarlet, rather large, numerously disposed in paniculate cymes; corolla salver-shaped; tube urceolate; limb four partite, spreading. Leaves fleshy, opposite, sessile or petiolate, toothed, serrated, or entire. For culture, &c., *see* **Crassula.**

K. crenata (crenate-leaved). *fl.* yellow, in very long loose spikes. Autumn. *l.* oblong-lanceolate, broadly toothed, crenated; crenatures usually double. *h.* 1ft. to 2ft. Sierra Leone, 1793. Stove shrub. (B. M. 1436, under name of *Cotyledon crenata.*)

K. farinacea (floury). *fl.* scarlet, in compact umbel-like heads. Summer. *l.* round-spathulate, entire, sessile. *h.* 6in. to 12in. Socotra, 1882. A handsome stove succulent decorative plant. (R. G. 1143.)

K. grandiflora (large-flowered). *fl.* rather large; corolla bright yellow, hypocrateriform; tube elongated, bottle-shaped; limb of four reflexed sepals; cyme terminal, sub-sessile, many-flowered. May. *l.* succulent, glaucous, 2in. to 3in. long, opposite, sessile, ovate or sub-rhomboidal, becoming gradually smaller up the stem; margins coarsely sinuato-crenate. Stem succulent. *h.* 2ft. India, 1863. Greenhouse. (B. M. 5460.)

KALE. *See* **Borecole.**

KALMIA (named in honour of Peter Kalm, 1715-1799, a pupil of Linnæus, who travelled in Canada and the Northern States, and became Professor at Abo). American Laurel. ORD. *Ericaceæ.* A genus comprising six species of ornamental hardy evergreen shrubs, of which one is from Cuba, and the rest from North America, extending from Florida to California and the Arctic regions. Flowers rose-coloured, purple, or white, showy, clustered or rarely scattered; bracts ovate to subulate, coriaceous, or firm and persistent; corolla broadly campanulate or sub-hypocrateriform. Leaves entire. Kalmias thrive under treatment similar to Rhododendrons and such-like plants, in a peaty soil, where the roots are provided with ample moisture. The best-known and most-grown species is *K. latifolia.* It is well adapted for forcing, in spring, for greenhouse or conservatory decoration. For this purpose, the plants should be potted up during winter, after the blossoms have well set. Propagated by cuttings of young shoots, inserted in sandy peat, and placed in a shady situation, under a hand glass; or by seeds, sown in shallow pans of sandy peat, and kept in a cold frame until the seedlings are large enough to handle, when they may be gradually hardened off, and transferred to the open air.

K. angustifolia (narrow-leaved).* *fl.* purple or crimson, not half so large as those of *K. latifolia,* disposed in lateral corymbs. Early summer. *l.* mostly in pairs or threes, oblong, obtuse, 1in. to 2in. long, petioled, light green above, dull or pale beneath. *h.* 2ft. to 3ft. Canada, 1736. A very pretty species. (B. M. 331.) There are several varieties, differing chiefly in the size of parts, and in the deeper and lighter shade of the corolla. The dwarf one, known as *nana,* is especially worth mention.

K. cuneata (wedge-shape-leaved). *fl.*, corolla white or whitish, $\frac{1}{3}$in. in diameter; inflorescence lateral, nearly glabrous. May and June. *l.* oblong, with cuneate base, 1in. long, almost sessile, and chiefly alternate, mucronate. *h.* 2ft. North and South Carolina, 1820. A low, somewhat pubescent shrub.

K. glauca (glaucous).* *fl.* lilac-purple, $\frac{1}{2}$in. to $\frac{2}{3}$in. in diameter; bracts large; sepals ovate, scarious-coriaceous, much imbricated. Spring. *l.* opposite, or rarely in threes, almost sessile, oblong or linear-oblong, or appearing narrower by the usual strong revolution of the edges, 1in. or less long, glaucous-white beneath. *h.* 1ft. to 2ft. 1767. (B. M. 177.)

K. hirsuta (hairy). *fl.* scattered and axillary, on pedicels longer than the leaves; corolla rose-purple, barely $\frac{1}{2}$in. in diameter; sepals ovate-lanceolate, leaflike, as long as the corolla, at length deciduous, leaving the old capsules bare. Summer. *l.* nearly sessile, plane-oblong or lanceolate, $\frac{1}{4}$in. to $\frac{1}{2}$in. long. *h.* 1ft. South-east Virginia to Florida, 1786. A free-branching shrub. (B. M. 138.)

K. latifolia (broad-leaved).* Calico Bush. *fl.*, inflorescence very viscid-pubescent; corolla rose-colour to white, $\frac{3}{4}$in. in diameter; fascicles numerous, crowded in compound terminal corymbs. Summer. *l.* alternate, or occasionally somewhat in pairs or threes, oblong or elliptical-lanceolate, acutish at both ends, petioled, bright green. *h.* 3ft. to 10ft. (in the South Alleghanies, sometimes 20ft.). Mountainous districts of Canada, Western Florida, &c., 1734. One of the most useful, elegant, and attractive of dwarf flowering shrubs. It is a slow-growing subject, but is

Kalmia—*continued.*

FIG. 356. FLOWERING BRANCH OF KALMIA LATIFOLIA.

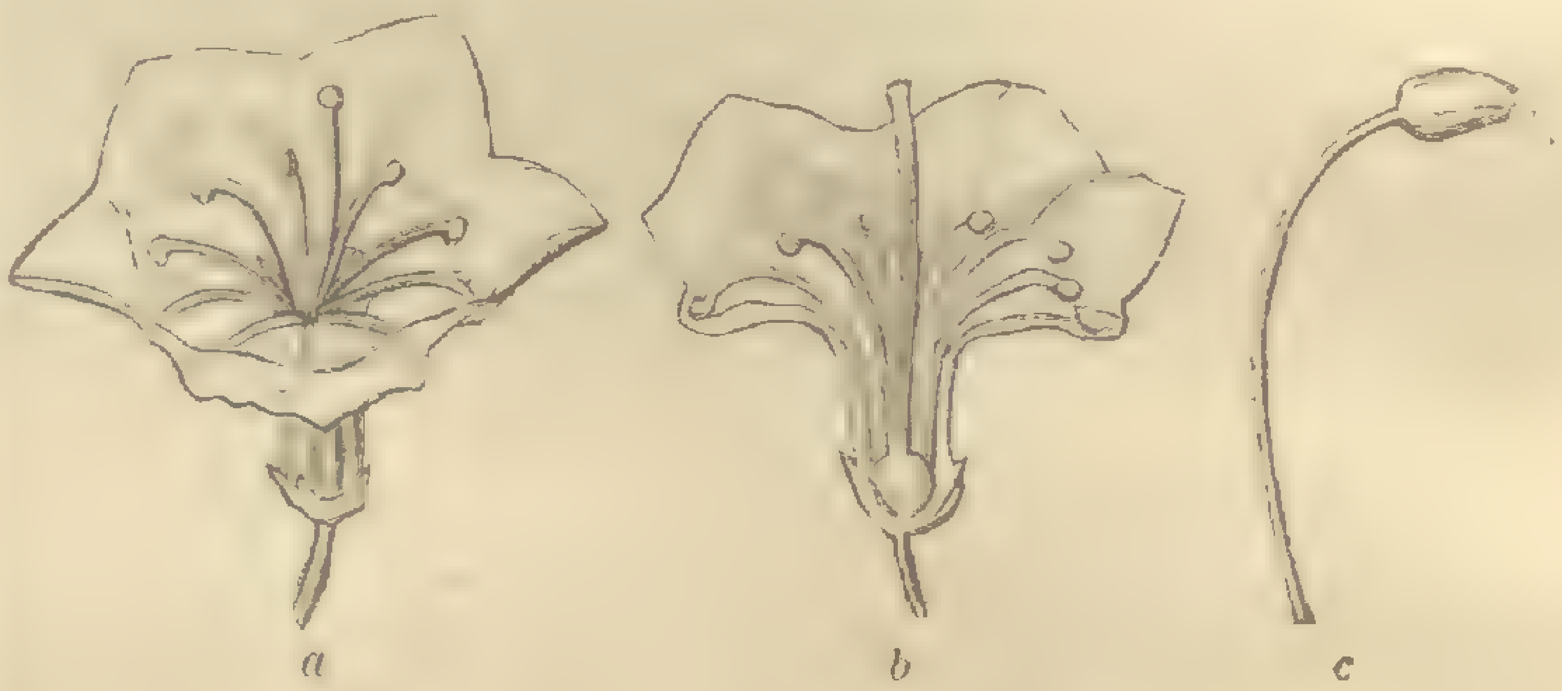


FIG. 357. KALMIA LATIFOLIA, showing (*a*) detached Flower; (*b*) Section of ditto; and (*c*) Stamen.

generally of very easy culture. For cutting purposes it is also useful, if a spike of flowers is taken with a good stem and a few leaves; but the blossoms can be seen nowhere to more advantage than on the bush. See Figs. 356 and 357. (B. M. 175.)

KALOSANTHES. A synonym of *Rochea.* Some of the plants formerly included under *Rochea* are now placed under **Crassula** (which *see*).

KARATAS (derivation of name uncertain). SYNS. *Nidularium, Regelia* (of Lemaire). ORD. *Bromeliaceæ.* A genus comprising about ten species of stove herbaceous perennials, natives of the West Indies, tropical South America, and several from Brazil. Flowers in dense, sessile, terminal heads. Leaves rosulate, often very long, spinoso-serrate. For culture, *see* **Billbergia.**

K. cruenta (bloody). *fl.* blue, red; spike capitate, sub-sessile. February to March. *l.* strap-shaped, obtuse, mucronate, spinosely dentate, tipped with blood-red; bracts broad-oval, imbricate, obtuse, concave. *h.* 1ft. Rio Janeiro, 1824. (B. M. 2892, under name of *Billbergia cruenta.*)

K. humilis (dwarf). *fl.* crimson, in central depressed tufts, surrounded by leaves. *l.* recurved, lanceolate, strongly toothed; lower ones greyish, mealy. *h.* 1ft. West Indies, 1789. See Fig. 358. (R. H. 1878, 190.)

K. Innocentii (Innocent's). *fl.* bright orange-red, produced in a nest-like crown. *l.* large, lanceolate, dark green on the upper side, deep reddish purple beneath; margins serrated. Brazil, 1862. A handsome and compact plant. (I. H. 1862, 329.)

K. Laurentii (Laurent's). *fl.* pale blue, in short heads. *l.* ligulate, recurved, abruptly acuminate, light green, dotted with dark brown; inner ones white towards the base. South America, 1867. An elegant plant. (R. G. 529.)

K. Legrellæ (Legrell's). *fl.* purple, white; bracts rose. *l.* 5ft. to 6ft. long, rigid, beset with curved spines, deep green above, subglaucous beneath. North Brazil, 1872. A noble species, the inflorescence of which is very handsome. (B. H. 1872, 129.)

K. olens (putrid-smelling). *fl.* purple, almost concealed by the closely-imbricating, broad, greenish-white bracts. *l.*, floral ones rich deep red; lower leaves full green, glabrous, about 1ft. long,

Karatas—*continued.*

1in. or more wide, spinulose-serrate at margin. *h.* 1ft. (B. M. 5502, under name of *Billbergia olens.*)

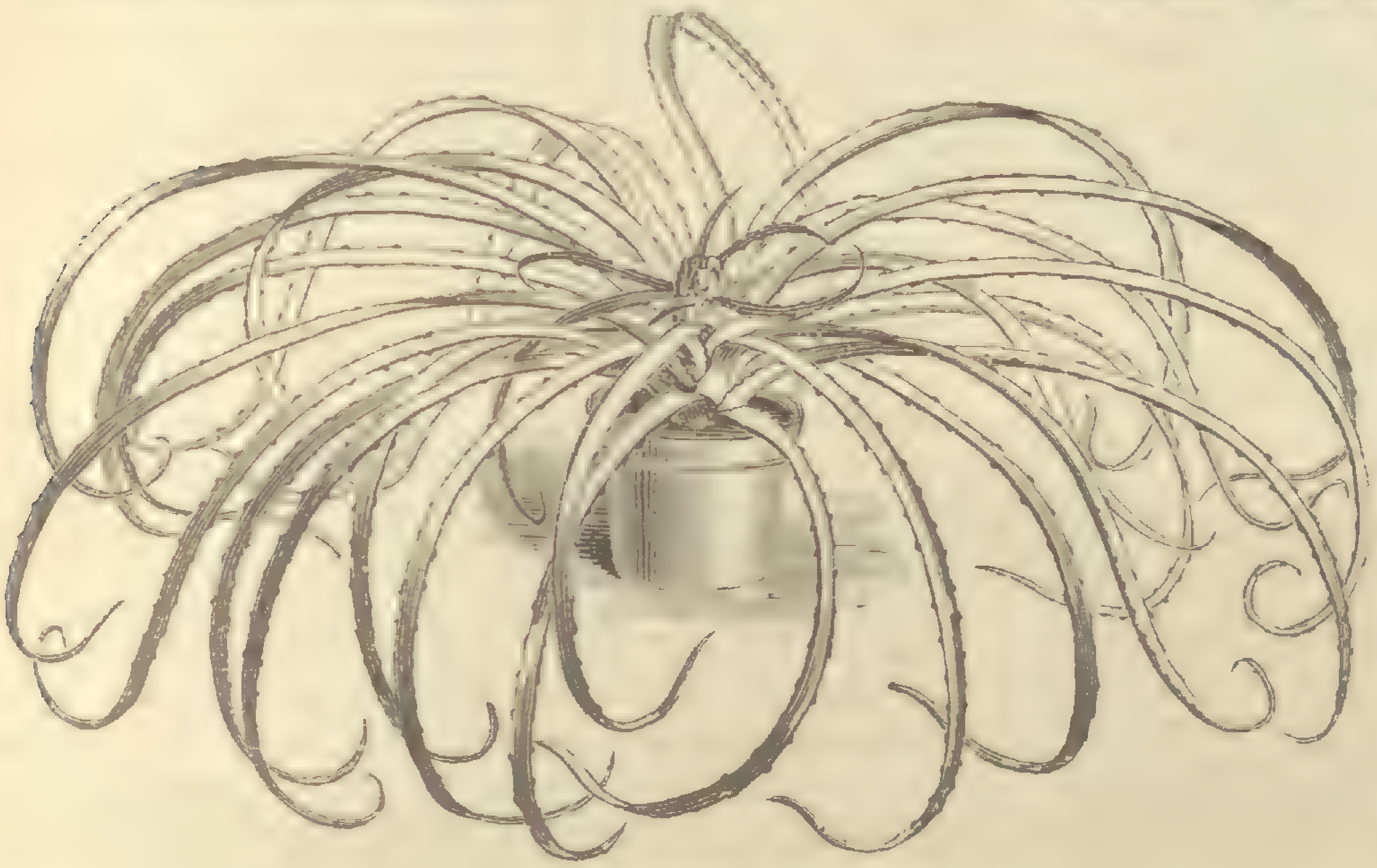


FIG. 358. KARATAS HUMILIS.

K. Plumieri (Plumier's). *fl.* pink, sessile, aggregate. *fr.* oval, 200 to 300 in number, sessile in a heap or central group, surrounded by paleaceous expanded leaves or bracts, and containing a succulent whitish or yellowish flesh under a coriaceous and yellowish bark. *l.* 6ft. to 7ft. long, radical, subulate-linear, sharp-pointed, spiny-edged. *h.* 2ft. West Indies, 1739. SYNS. *Bromelia Karatas* and *B. sceptrum.*

FIG. 359. KARATAS SCHEREMETIEWI.

K. Scheremetiewi (Scheremetiew's). *fl.* white, blue. *l.* green; floral ones bright red, much shorter than the outer ordinary leaves. *h.* 6in. to 12in. Probably Brazil. SYNS. *Caraguata serrata, Nidularium Scheremetiewi.* See Fig. 359. (R. H. 1875, 230.)

K. spectabilis (showy). *fl.* blood-red, white, pale violet-blue, in a crowded, terminal, flat-topped fascicle. *l.* about 1ft. long by 1½in. to 2in. broad, broadly strap-shaped, from a broad sheathing base, slightly concave; margin with small, remote, spiny teeth; upper surface dark green, except the tip, which presents a bright, blood-red patch ½in. deep on both surfaces; under surface covered with alternate transverse bands of dull green or purplish and dirty white. *h.* 1ft. Brazil. (B. M. 6024, under name of *Nidularium spectabile.*)

KARELINIA. Now included under **Pluchea** (which *see*).

KAULFUSSIA (named after Dr. G. F. Kaulfuss, a Professor of Botany at Halle, who died in 1830). ORD. *Filices.* A curious and very variable stove fern. Sori composed of from ten to fifteen sessile sporangia, arranged in concrete raised circular masses, hollow in the centre. For culture, *see* **Ferns.**

Kaulfussia—*continued.*

K. æsculifolia (Chestnut-leaved). *sti.* 1ft. to 1½ft. long, auricled at the base. *fronds* ternate or quinate-digitate; the central pinnæ the largest, oblong-spathulate, 6in to 12in. long, 3in. to 4in. broad, edge subentire; others similar but smaller. *sori* copious, scattered. Assam, Malay Islands, &c. The frond is like a Chestnut leaf, and the under surface is dotted over with copious stomata-like pores.

The plant usually known as *Kaulfussia amelloides* is **Charieis heterophylla** (which *see*).

KAURI PINE. *See* **Dammara australis.**

KEELED. Shaped like the keel of a boat; that is to say, with a sharp projecting ridge, arising from a flat or concave central plate; *e.g.*, the leaves of sedges, and of many Liliaceous plants.

KEFERSTEINIA. Now included under **Zygopetalum** (which *see*).

KELLETTIA. A synonym of **Prockia** (which *see*).

KELP. The mineral residue or ash obtained by burning different kinds of seaweed. It was formerly of great commercial value and importance, as the source of the carbonate of soda used in glass and soap making, &c. From the quantity of potash which Kelp contains (17·5 per cent.), and the importance of this as an ingredient of soils, its value is at once apparent. It has been applied, with more or less success, to crops of Potatoes, Broccoli, Cabbage, &c.

KENNEDYA (named after an English nurseryman). ORD. *Leguminosæ.* A genus comprising eleven species of twining or prostrate, greenhouse perennial herbs, from Australia. Flowers red or nearly black, showy, on axillary peduncles, racemose, sub-umbellate or solitary. Legumes linear, compressed. Leaves pinnate, trifoliolate, rarely one or five-foliolate, stipellate; stipules broad, striated, sometimes very broad and connate. Kennedyas are fast-growing plants, well adapted for training up greenhouse pillars or rafters. They may be readily propagated from seeds, which are usually produced in great abundance, and may be sown in spring or summer; or from cuttings of rather firm side shoots, inserted at the same season, in peaty soil, and placed in a close, warm frame. Kennedyas may be grown in pots and trained over trellises if desired, but they succeed better when planted out, in a greenhouse, in a compost of peat and loam. Plenty of water should be given in spring and summer, but not much will be necessary in winter, when the plants are at rest. An ordinary greenhouse temperature will be sufficiently high. Insects, especially Scale and Mealy Bug, are frequently very troublesome, and as the numerous growths become so much entwined, it is difficult to effect a clearance. Taking the whole plant down, and thoroughly cleansing it with an insecticide before being replaced, is the best plan. An occasional syringing with petroleum and water proves a good preventive against the attacks of Bug. *K. prostrata Marryattæ* is one of the best of greenhouse twining plants, and, as its leaves and stems are downy, it is seldom attacked by insects of any description.

K. coccinea (scarlet). *fl.* scarlet; peduncles bearing three to nine flowers, in an umbellate head. May to August. *l.* having three obovate leaflets; stipules lanceolate, spreading. 1803. SYN. *K. inophylla.*

K. Comptoniana. *See* **Hardenbergia Comptoniana.**

K. cordata. *See* **Hardenbergia monophylla.**

K. eximia (choice). *fl.* scarlet, two, three, or more together in an umbel or very short raceme. *l.*, leaflets three, ovate or obovate, very obtuse. Plant prostrate or twining. (P. M. B. xvi. 35.)

K. glabrata (glabrous). *fl.* scarlet, several together in a small umbel, on axillary peduncles. *l.*, leaflets three, cuneate or

Kennedya—*continued.*

obovate-truncate, mucronate; stipules broad, veined. A slender, twining, glabrous species. (B. M. 3956; B. R. 1838.)

K. inophylla (nerve-leaved). A synonym of *K. coccinea.*

K. longiracemosa. *See* **Hardenbergia monophylla.**

K. macrophylla. *See* **Hardenbergia Comptoniana.**

K. monophylla. *See* **Hardenbergia monophylla.**

K. nigricans (blackish). *fl.* deep violet-purple, almost black, with a large, greenish-yellow blotch on the standard. March. *l.*, leaflets broadly ovate or rhomboidal, obtuse or emarginate; stipules small, striate, reflexed. 1832. A large twining species. (B. M. 3562; B. R. 1715.)

K. ovata. *See* **Hardenbergia monophylla.**

K. prostrata (prostrate).* *fl.* scarlet; peduncles one or two-flowered. March to June. *l.*, leaflets 3½in. long, ovate, broadly ovate or orbicular, pubescent or hirsute; stipules broadly cordate, acute or acuminate. 1790. SYN. *Glycine coccinea* (under which name it is figured in B. M. 270).

K. p. Marryattæ (Mrs. Marryatt's).* *fl.* light scarlet; peduncles four-flowered. March to June. *l.*, leaflets three, oblong, obtuse, undulated; stipules and bracts cordate. 1834. A free-growing twining plant, and, perhaps, the best of all the Kennedyas.

K. rubicunda (reddish).* *fl.* of a dull or dark red, in pedunculate racemes rarely exceeding the leaves. May. *l.*, leaflets three, usually ovate, but varying from broadly-rhomboid obovate or almost orbicular, to ovate-lanceolate or lanceolate and acute. 1788. A large twining species. (B. M. 268, under name of *Glycine rubicunda.*)

K. Stirlingii (Stirling's). *fl.* scarlet, on axillary peduncles. May. *l.*, leaflets three, ovate-orbicular, very obtuse, usually above 1in. long; stipules broadly cordate, usually large and much veined. 1834. Plant trailing or twining. (B. R. 1845.)

KENTIA (named in honour of Lieut.-Col. Kent). ORD. *Palmæ.* A genus comprising six species of ornamental stove palms, natives of New Guinea and the Moluccas, allied to *Areca.* Flowers on branched spikes. Leaves terminal, equally pinnatisect; segments sub-opposite, linear-lanceolate, acuminate or bidentate. Perhaps only a couple of species now retained in the genus are in cultivation, and these thrive in a compost of loam and peat, in equal proportions, to which may be added a little silver sand. They require plenty of pot room, and copious supplies of water throughout the summer, both at the roots and overhead. When attacked by Red Spider or Thrips, the plants must be sponged with soapy water. Propagated by imported seeds, which quickly germinate in a light sandy soil, if placed on a hotbed.

K. Baueri. *See* **Rhopalostylis Baueri.**

K. Belmoreana. *See* **Howea Belmoreana.**

K. Canterburyana. *See* **Hedyscepe Canterburyana.**

K. costata (ribbed). *l.* regularly pinnatisect, with very numerous linear-lanceolate acuminate segments, in old plants about 10ft. long and 3ft. wide. Stems 80ft. to 90ft. high. Spadix branched, with erect, fastigiate branches. Aru, &c.

K. Forsteriana. *See* **Howea Forsteriana.**

K. gracilis (of Lindley). *See* **Kentiopsis divaricata.**

K. Joannis. *See* **Veitchia Joannis.**

K. Lindeni. *See* **Kentiopsis macrocarpa.**

K. Macarthurii. *See* **Ptychosperma Macarthurii.**

K. robusta. *See* **Cyphosperma Viellardii.**

K. sapida. *See* **Rhopalostylis sapida.**

K. Storckii. *See* **Veitchia Storckii.**

K. Viellardii. *See* **Cyphosperma Viellardii.**

K. Wendlandiana. *See* **Hydriastele Wendlandiana.**

KENTIA, of Steudel. A synonym of **Fagræa** (which *see*).

KENTIOPSIS (from *Kentia*, and *opsis*, resemblance; on account of its likeness to *Kentia*). ORD. *Palmæ.* A genus containing three species of stove palms, closely allied to **Kentia** (which *see* for culture).

K. divaricata (divaricate). *l.* pinnate; leaflets leathery, alternate, when young a fine red colour. *h.* 30ft. New Caledonia, 1876. SYN. *Kentia gracilis.* (I. H. n. s. 409.)

K. macrocarpa (large-fruited). *l.* pinnate, ovate in outline when young; pinnæ somewhat distant, oblong-lanceolate; petioles red. Young leaves deep olive-crimson. Stem stout, smooth. New Caledonia, 1876. A handsome species, of vigorous habit. SYN. *Kentia Lindeni.*

KENTROPHYLLUM (from *kentron*, a spine, and *phyllon*, a leaf). ORD. *Compositæ.* This genus is now included, by the authors of "Genera Plantarum," under *Carthamus.* Flower-heads surrounded by a number of prickly leafy scales. *K. arborescens*, being a half-hardy evergreen shrubby species, requires winter protection, and may be increased, during the spring, by striking cuttings of the young shoots under a handlight.

K. arborescens (tree-like). *fl.-heads* yellow. August. *l.* bright green, elongate, lanceolate, amplexicaul, with sinuate spinose-dentate margins. *h.* 6ft. Spain, 1731. (B. M. 3302.)

KENTUCKY COFFEE-TREE. *See* **Gymnocladus canadensis.**

KEPPLERIA. A synonym of **Oncosperma** (which *see*).

KERAMANTHUS (from *keramos*, a jar, and *anthos*, a flower; in allusion to the form of the calyx). ORD. *Passifloreæ.* A stove herbaceous perennial, of more botanical than horticultural interest. It requires to be kept rather dry during the season of rest.

K. Kirkii (Kirk's). *fl.* greenish, tubular. *l.* large, ovate, pubescent. *h.* 2ft. Zanzibar, 1875. (B. M. 6271.)

KERMES OAK. *See* **Quercus coccifera.**

KERRIA (named after M. Kerr, sometime Superintendent of the Botanic Garden in Ceylon). ORD. *Rosaceæ.* A genus (one or two species) of slender-branched, twiggy shrubs. *K. japonica*, the only species known to cultivation, is a handsome, erect, hardy, deciduous plant. It thrives in any good loamy soil. Increased by cuttings of the young shoots, inserted under a handlight; by layers; or by divisions of the plants. The sort most generally seen in cultivation is that with double blossoms; the single-flowered form is a much more elegant plant, having a very graceful habit, and being nearly always in flower.

FIG. 360. FLOWERING BRANCHLET OF KERRIA JAPONICA FLORE-PLENO.

K. japonica (Japanese).* *fl.* orange-yellow, solitary, terminal; peduncles scarcely ½in. long, glabrous; petals five, oblong-elliptical, obtuse, spreading. *l.* alternate, ovate-lanceolate, sharply and doubly serrated, conduplicate, stalked, 1in. to 1½in. long, ½in.

Kerria—*continued.*

to 1in. wide, bright green, shining, and almost glabrous above, paler and slightly hairy beneath. *h.* 3ft. to 4ft. Japan, 1700. (B. R. 1873; S. B. F. G. ser. ii. 337.) In addition to the single and double-flowered (see Fig. 360) sorts, there is a very pretty form, having the leaves variegated with sea-green, creamy-white, and pure white.

KETELEERIA. Included under *Abies.*

KIDNEY BEAN. *See* **Beans.**

KIDNEY-SHAPED. Crescent-shaped, with the ends rounded.

KIDNEY VETCH. *See* **Anthyllis.**

KIELMEYERA (named after K. F. Kielmeyer, of Wurtemberg, 1765-1844, a writer on botany). SYN. *Martinieria.* ORD. *Ternströmiaceæ.* A genus comprising about fifteen species of stove evergreen trees or shrubs, full of resinous juice, natives of Brazil. Flowers showy, terminal, disposed in racemes or short panicles, or rarely solitary; petals five-twisted. Leaves evergreen, often petiolate. Only one species has been introduced. It thrives in a fibry, sandy loam. Cuttings of young shoots will root in sand, under a bell glass, in heat.

K. excelsa (tall). *fl.* white; petals obovate, smooth, disposed in racemes. June. *l.* oblong, sub-elliptic, obtuse, quite smooth. *h.* 60ft. 1833. Tree.

KINGIA (named after Captain P. G. King, Governor of New South Wales). ORD. *Junceæ.* A monotypic genus, the species being a long-lived greenhouse plant, with an erect wooden caudex. For culture, *see* **Xanthorrhæa.**

K. australis (Southern). *fl.* arranged in a globular head, about 2in. in diameter; perianth segments lanceolate; peduncles several from the tuft of leaves, 6in. to 12in. long, covered with broad sheathing bracts. *l.* 2ft. to 3ft. long, and only one to two lines broad, in the greater part of their length, spreading or recurved, flat, or more or less triquetrous; edges usually serrulate. Caudex sometimes many feet in height. West Australia.

KING PLANT. *See* **Anœctochilus setaceus.**

KIRGANELIA. This genus is now included under **Phyllanthus** (which *see*).

KITAIBELIA (named in honour of Paul Kitaibel, 1757-1817, formerly Professor of Botany at Pesth, in Hungary). ORD. *Malvaceæ.* A genus consisting of but one species, which is an ornamental, hardy, robust-growing, tall, perennial herb. It thrives well in any rough garden soil, and may be readily increased by divisions.

K. vitifolia (Vine-leaved). *fl.* white or rose-coloured, showy, pedunculate. Late summer and autumn. *l.* five-lobed, acute, toothed, resembling those of the Vine in shape. *h.* 6ft. to 8ft. Eastern Europe. (B. M. 821.)

KITCHEN GARDEN. *See* **Garden.**

KLEINHOVIA (named after Kleinhoff, once Director of the Botanic Garden in Batavia). ORD. *Sterculiaceæ.* A genus consisting of a single species, which is a very handsome stove evergreen tree, native of India. It thrives in a compost of peat and loam. Cuttings of the young ripened shoots will root in sand, if placed in heat, under a bell glass.

K. Hospita (stranger). *fl.* pink, disposed in large terminal panicles. July to September. *fr.* top-shaped, bladdery, five-winged, with five cells, having a single seed in each. *l.* entire, three to seven-nerved. 1800.

KLEINIA (of Haworth). Now included under **Senecio** (which *see*).

KLOPSTOCKIA. A synonym of *Ceroxylon.*

KLUGIA (named in honour of Dr. William Klug, a lover of botany). SYN. *Glossanthus.* ORD. *Gesneraceæ.* A genus comprising three or four species of herbaceous plants, of which one is a native of Mexico and Central America, and the rest inhabit the East Indian Peninsula, Ceylon, and the Malayan Archipelago. Only one species

Klugia—*continued.*

—*K. Notoniana*—has yet been introduced. It is a stove evergreen, thriving in a mixture of equal parts sandy loam and peat, and requiring plenty of moisture while growing. Propagated by cuttings.

K. Notoniana (Noton's). *fl.* blue, in secund racemes; calyx five-angled. Summer. *l.* repandly toothed, half cordate, that is, with an unequal base. Stem fleshy, marked with a dense, villous line. *h.* 1ft. India, 1848. (B. M. 4620.)

KNIGHTIA (named after Thos. A. Knight, 1758-1838, a pomologist, and at one time President of the London Horticultural Society). SYN. *Rymandra.* ORD. *Proteaceæ.* A genus comprising three species of trees or shrubs, of which one is from New Zealand, and the two others from New Caledonia. Flowers geminate, pedicellate, in dense, sessile, axillary, lateral or terminal racemes. Leaves scattered, coriaceous, entire or deeply toothed. *K. excelsa*, the only species yet introduced, is an ornamental greenhouse evergreen tree, growing in its native country to a height of 100ft., and having much the habit of a Lombardy Poplar. It thrives in a compost of peat, to which a small quantity of sandy loam is added. Plenty of drainage must be afforded. Cuttings of ripe shoots, with leaves intact, except at the base, will root in sandy soil, under a bell glass, in a very gentle bottom heat.

K. excelsa (lofty). *fl.* flesh-coloured, in axillary racemes, which are nearly as long as the leaves, and covered with reddish-brown velvety down. *l.* very harsh, linear-oblong, coarsely and rather bluntly toothed, from 4in. to 6in. long. New Zealand, 1824. The wood of this tree is mottled with red and brown, and is largely employed in making furniture. (T. L. S. x. 2.)

KNIPHOFIA (named after Johann Hieronymus Kniphof, 1704-1763, a Professor of Medicine at Erfurt in the eighteenth century). SYNS. *Rudolphœmeria, Triclissa, Tritoma, Tritomanthe, Tritomium.* ORD. *Liliaceæ.* This small genus of hardy, tufted, herbaceous plants is usually known as *Tritoma*, but the name here adopted is a prior one, and, therefore, the more correct. The species number about sixteen, and are natives of tropical and South Africa and Madagascar. Flowers scarlet and yellow, showy, densely racemose or spicate, sub-sessile or shortly pedicellate, closely deflexed; scapes leafless, tall, simple. Leaves radical, long, narrow, firm. Kniphofias are very showy and ornamental border plants. They require protection throughout winter, in the more northern parts of the country. The species best known, and most extensively cultivated, is *K. aloides.* They all prefer a light, sandy soil, to which may be applied a liberal top-dressing of well-rotted manure, and plenty of water in spring and summer. Propagated by divisions of the crown, in early spring, or by seeds, when procurable.

K. aloides (Aloe-like).* Common Flame Flower. *fl.* handsome coral-red, fading to orange, and ultimately to a greenish-yellow, large, tubular, disposed in dense, oval-oblong spikes. Late summer and autumn. *l.* very long and narrow, channelled, keeled, toothed on the edges and keel. *h.* 3ft. to 4ft. South Africa, 1707. SYNS. *K. Uvaria* and *Tritoma Uvaria.* This is the handsomest species in cultivation, and one of the most gorgeous of autumn-flowering plants. It is suited equally well for the mixed border or shrubbery, or for planting in lines where there is a background of green foliage. There are several varieties of this species, including the following:

K. a. glaucescens (glaucous). South Africa, 1859.

K. a. maxima (large-flowered).* A variety much taller than the type, and having stouter stems and longer flower-spikes. It is sometimes known as *grandis.* Orange Free State, 1862. (B. M. 6553.)

K. a. serotina (late-flowering). South Africa, 1859.

K. Burchelli (Burchell's).* *fl.* scarlet and yellow, tipped with green; scape marked with black spots. Autumn. *l.* light green. *h.* 1½ft. South Africa, 1816. A very desirable plant. (B. R. 1745, under name of *Tritoma Burchelli.*)

K. carnosa (fleshy). *fl.* apricot-yellow, rather small, with bright yellow anthers; spike cylindrical, about 3in. long and 1½in. broad; scape about 1ft. high. Autumn. *l.* in several rosettes. Abyssinia, 1879. A handsome species.

K. caulescens (caulescent). *fl.* reddish-salmon colour at first, but ultimately becoming white tinged with greenish-yellow; disposed in a dense head of about 6in. in length; scape 4ft. to 5ft. long. Autumn. *l.* of a very glaucous blue-grey tint. Stem very thick. South Africa, 1862. (B. M. 5946.)

Kniphofia—*continued.*

K. comosa (tufted). *fl.* yellow, disposed in a dense oblong-obtuse head; stamens very long. August. *l.* linear, erect, bright green acuminate, almost triquetrous. *h.* 1ft. to 2ft. Abyssinia, 1879. (B. M. 6569.)

K. foliosa (leafy). *fl.* bright yellow or tinged with red, in a dense cylindrical raceme, 6in. to 12in. long. August. *l.* in a dense basal rosette, ensiform, acuminate, 3in. to 4in. broad at the clasping base, tapering to a long point, green on both surfaces. Abyssinia, 1880. SYN. *K. Quartiniana.* (B. M. 6742.)

K. Leichtlinii (Leichtlin's).* *fl.* dull pale vermilion-red and yellow. August. *l.* 4ft. long, spreading all round, about ¾in. in diameter at one-third distance above the base, triquetrous, bright green. 1880. Abyssinia. (B. M. 6716.)

K. L. distachya (two-ranked). A robust variety, with broader leaves, and rather shorter flowers than the type; peduncle sometimes two or three-headed. 1884.

K. Macowani (MacOwan's). *fl.* bright orange-red, disposed in cylindric-ovoid racemes, 3in. to 5in. long. August. *l.* sub-erect, narrow-subulate, strongly keeled, deeply channelled. *h.* 1ft. to 1½ft. South Africa, 1874. (B. M. 6167.)

K. præcox (early). *fl.* bright red or yellow, on scapes nearly 2ft. long. May. *l.* about 2ft. long, sharply keeled, and with toothed edges. South Africa, 1862. A handsome species, with the habit of *K. aloides.* (Ref. B. 169.)

K. pumila (dwarf). *fl.* orange-red, in a dense-flowered raceme, 3in. to 5in. long; scape longer than the leaves. August. *l.* glaucous, with scabrid margins, 1ft. to 1½ft. long, about ½in. wide. South Africa, 1774. (B. M. 764, under name of *Tritoma pumila.*)

K. Quartiniana (Dr. Quartin Dillon's). A synonym of *K. foliosa.*

K. Rooperi (Rooper's).* *fl.* orange-red, becoming yellow with age, about 1½in. long, densely crowded; raceme 6in. to 8in. long, ovoid-oblong; scape stout, 1ft. long; bracts few, short. November. *l.* 1½ft. long, 1¾in. broad, ensiform, gradually acuminate, deeply keeled at the back, dark green, not glaucous; margins serrulate. *h.* 2ft. British Caffraria, 1854. SYN. *Tritoma Rooperi.* (B. M. 6116.)

K. triangularis (three-angled). Very like *K. Macowani*; but the foliage is broader and longer, and in this respect it resembles *K. aloides.* A very desirable plant.

K. Uvaria (Uvaria). A synonym of *K. aloides.*

KNIVES. Various descriptions of Knives are used in gardens, and some, at least, are indispensable for budding, grafting, pruning, and many other purposes. They are specially manufactured for different work, and the numerous sorts are named accordingly. Budding Knives have usually an ivory handle, and either a straight edge on the blade, or one curved backwards at the point. These are also in general use for propagating, and for other light work. Pruning Knives are of various forms, the blade in some being immovable in the handle, and the Knife kept in a sheath when not in use. The handles of Pruning Knives should be of buckhorn, to prevent slipping of the hand when using them. A curved blade is best adapted for pruning large branches, or for use in ordinary rough work, a straight-edged one being preferable for small shoots. Knives for Peach-pruning are sometimes made with a blade tapering from the back to a fine point, to admit of their cutting out small shoots where crowded, without causing injury to those left. The Vegetable Knife has a large curved blade, and is chiefly used for cutting and dressing vegetables. An Asparagus Knife has a serrated blade on the end of an iron shank, 1ft. or more long, which is

FIG. 361. ASPARAGUS KNIFE.

fixed into a handle somewhat like that of a trowel (see Fig. 361). It is made in this way for cutting off the young shoots below ground. *See also* **Budding Knives** and **Pruning Knives.**

KNOWLTONIA (named in honour of Thomas Knowlton, 1692-1782, once Curator of the botanic garden at Eltham). SYN. *Anamenia.* ORD. *Ranunculaceæ.* This

Knowltonia—*continued.*

genus comprises five or six species of greenhouse or half-hardy perennial herbs, having a very acrid juice, natives of the Cape of Good Hope. Flowers dull-coloured, in branching cymes or umbels; petals whitish, yellowish, or greenish. Leaves from the rootstock stalked, three-parted, or twice three-parted; leaflets stalked, toothed or cut. The species thrive in a loam and peat soil. Propagated by dividing at the root, or by seed.

K. vesicatoria (blistering). *fl.* yellow, green, in simple few-flowered umbels. February to April. *l.* biternate, thick; segments ovate or cordate, serrulate, or nearly entire. *h.* 1½ft. 1691. (B. M. 775.)

KNOXIA (named after R. Knox, a traveller, and resident in Ceylon). SYN. *Cuncea.* ORD. *Rubiaceæ.* A genus containing six or eight species of hirsute, glabrous, or pubescent, stove evergreen herbs or sub-shrubs, natives of the whole of India, Java, China, the Philippine Islands, and tropical Australia. Flowers rose or lilac, small, in terminal, sessile, or pedunculate cymes; corolla salver or funnel-shaped, with lanceolate segments and a hairy throat. Leaves opposite or sub-fasciculate in the axils, petiolate, ovate, or lanceolate. The species thrive in a compost of peat and loam. Cuttings of young shoots will root in sand, during April or May, if placed under a glass, in a gentle heat. The species described below is the only one in cultivation.

K. corymbosa (corymbose). *fl.* white or purplish. Summer. *l.* lanceolate, villous. Stem cylindric or obscurely four-angled, dichotomously branched. *h.* 2ft. to 3ft. India, 1820. A slender, erect annual.

KŒHLERIA. This is regarded, by Bentham and Hooker, as synonymous with **Isoloma** (which *see*).

K. hondensis. *See* **Isoloma hondense.**

K. Seemanni. *See* **Isoloma Seemanni.**

KOELLENSTEINIA. A synonym of *Aganisia.*

KŒLLIKERIA (named after Professor Koelliker, of Wurzburg, author of a List of the Wild Plants of Zurich, &c.). ORD. *Gesneraceæ.* A monotypic genus, the species being a low herbaceous stove plant. It succeeds in a compost of loam and leaf mould, with a little sand intermixed. Propagation may be effected by division of the tubers.

FIG. 362. KŒLLIKERIA ARGYROSTIGMA, showing Habit and detached Single Flower.

K. argyrostigma (silver-spotted). *fl.* white or cream-colour, spotted with red; racemes erect, from the axils of the upper leaves, glanduloso-hirsute, longer than the leaves. Summer. *l.* opposite, elliptical, obtuse, downy, deep rich velvety-green, with scattered, rounded, white spots. Stem short, branched. *h.* 1ft. Tropical America, 1845. See Fig. 362. (B. M. 4175, under name of *Achimenes argyrostigma.*)

KOELREUTERIA (named after Joseph G. Koelreuter, 1733-1806, once Professor of Natural History at Carlsruhe). ORD. *Sapindaceæ*. A monotypic genus. The species is a small, handsome, hardy deciduous tree, from North China, having a picturesque, irregular habit of growth. Any ordinary garden soil suits it; but it thrives best, and flowers most freely, in a sheltered situation. Propagated by cuttings of the young shoots, in spring; or by layers, in early autumn.

FIG. 363. KOELREUTERIA PANICULATA, showing Leaf and Portion of Inflorescence.

K. paniculata (panicled).* *fl.* yellow, disposed in large, terminal, many-flowered, branched panicles. June and July. *fr.* or capsule large, vesiculate, inflated, three-lobed, very conspicuous in autumn. *l.* alternate, exstipulate, deciduous, impari-pinnate; leaflets opposite or alternate, membranaceous, deeply toothed. *h.* 10ft. to 15ft. 1763. See Fig. 363. (B. R. 330.)

KŒNIGA (name revived by Robert Brown, in commemoration of Charles Kœnig, formerly of the British Museum). ORD. *Cruciferæ*. A small genus of very pretty hardy plants, included, by Bentham and Hooker, under *Alyssum*, but which, for garden purposes, may be kept distinct. Flowers racemose or clustered; petals entire; pouch sub-ovate, with flattish leaves; cells one or few-seeded. The species are of easy culture in any ordinary soil, and may be increased by seeds, sown in spring.

K. maritima (sea). Common Sweet Alyssum. *fl.* white, small, very sweet-scented; racemes terminal, somewhat leafy at the base. Spring. *l.* quite entire, almost linear, hoary. *h.* 6in. to 9in. Europe. This elegant little, much-branched, self-sowing annual is an excellent bee plant. SYN. *Alyssum maritimum*. (Sy. En. B. 140.)

Kœniga—*continued.*

K. m. variegata (variegated). *l.* edged with white or yellow. A very effective, half-hardy plant, requiring protection during winter.

K. spinosa (thorny).* *fl.* white, in small terminal clusters. Early summer. *l.* lanceolate, acute, silvery. Stem shrubby; old branches and peduncles spiny. *h.* 4in. to 8in. France, 1683. A pretty alpine. SYN. *Alyssum spinosum*.

KOHL-RABI (*Brassica oleracea Caulo-rapa*). Kohl-Rabi is a very distinct vegetable, not very largely cultivated, except as a field crop. It comes between the Cabbage and Turnip, and is generally used as a substitute for the latter. The upper part of the stem swells into a large fleshy head above ground, resembling a Turnip

FIG. 364. KOHL-RABI.

(see Fig. 364). Kohl-Rabi has several advantages over some other vegetables, and consequently deserves a place in gardens. It is exceedingly hardy, withstanding even severe frosts, and also resists drought much better than the Turnip.

Cultivation. Like all other plants of the *Brassica* tribe, Kohl-Rabi is raised from seed, which should be sown outside (any time from April to June, inclusive), in an ordinary seed bed, or where the crop is intended to be grown. In the former case, transplant, when 2in. high, into any good, well-manured ground, allowing a distance of about 1¼ft. between the rows, and 1ft. in the rows; and, if the latter plan is adopted, thin out to these distances. Water should be given for a time until fresh roots are emitted. An occasional hoeing, to keep the surface soil open and clean, is nearly all that will be necessary for after-treatment. The fleshy heads are fit for use when about the size of a Dutch Turnip. The crop is frequently of great importance when failure with Turnips is caused by insects or drought, which seldom affect the Kohl-Rabi.

Sorts. There are about half-a-dozen sorts in cultivation, but only two are recommended for garden purposes; the others are more or less coarse and vigorous in habit. These are Early Purple Vienna and Early White Vienna, dwarf and useful sorts, the bulbs varying chiefly in the colour of their skins. They are not good if allowed to get old and large before being used.

KOLA-NUT TREE. *See* **Cola.**

KOPSIA (named after Jan Kops, 1765-1849, Professor in Utrecht). SYN. *Calpicarpum*. ORD. *Apocynaceæ*. A genus comprising four species of stove, evergreen, glabrous trees or shrubs, allied to *Cerbera*; they are natives of the Malayan Peninsula and Archipelago. Flowers white or pink, very ornamental, in short cymes; corolla salver-shaped; tube elongated, slender. Leaves opposite, mem-

Kopsia—*continued.*

branaceous or sub-coriaceous, penninerved. Only one species has been yet introduced; it thrives in a compost of peat and sandy loam. Cuttings of rather firm young shoots will root in sand, if placed in a gentle bottom heat.

K. fruticosa (shrubby). *fl.* red, in terminal corymbs. May. *l.* broad, lanceolate. Pegu, 1818. A stove evergreen shrub. (B. M. 4220; B. R. 391, under name of *Cerbera fruticosa.*)

KOROLKOWIA SEWERZOWI. *See* **Fritillaria Sewerzowi.**

KORTHALSIA (named after Peter W. Korthals, a German botanist, of this century). Syn. *Calamosagus.* Ord. *Palmeæ.* A genus comprising about sixteen species of stove palms, natives of the Malayan Archipelago and New Guinea, closely allied to *Calamus.* Flowers small; spadices loosely racemose, pendulous. Leaves alternate, pinnatisect. For culture, *see* **Calamus.**

K. Junghuhnii (Junghuhn's). *l.*, long-stalked, terminating in a hooked tendril-like process; segments seven to nine, cuneate-rhomboid, shortly apiculate, pale whitish beneath. Java.

K. scaphigera (scape-bearing). *l.* pinnate, 2ft. to 4ft. long; rachis sparingly armed with short retrorse spines, terminating in a long, recurved, thorny tendril; young ones fugaciously white-tomentose beneath. Andaman Isles, Malacca. A large climbing palm, with canes up to ½in. in diameter.

KRAMERIA (named after John George Henry and William Henry Kramer, father and son, Austrian botanists). Ord. *Polygaleæ.* A genus comprising twelve species of diffuse, stove, glabrous trees or shrubs, natives of the warmer parts of America. Flowers axillary, or on the tops of the branchlets, generally solitary or disposed in spike-formed racemes. Leaves alternate, coriaceous. Only two species have been introduced. *K. pauciflora* thrives in a compost of sandy loam and fibry peat. Cuttings will root in sand, if placed under a hand glass, in heat. The same treatment will answer for the other species.

K. pauciflora (few-flowered). *fl.* red; pedicels few, longer than the leaves, bearing two bracts on the middle of each. *l.* oblong-linear, villous. *h.* 4ft. Mexico, 1824.

K. triandra (three-stamened). *fl.* shining scarlet. Summer. *l.* alternate, irregularly scattered or crowded, sessile, obovate, apiculate, entire, clothed with adpressed silvery hairs. Peru. Low shrub. This plant furnishes the Rhatany root of the British Pharmacopœia; the essential constituent of rhatany is a form of tannic acid. (B. M. Pl. 30.)

KREYSIGIA (named after F. L. Kreysig, 1769-1839, a German botanist, and author of a treatise on the comparison of animal and vegetable life). Syn. *Tripladenia.* Ord. *Liliaceæ.* A monotypic genus, the species being a very pretty, half-hardy, herbaceous perennial, having a roughish, simple stem, and a knotty rhizome. It is of easy culture in any ordinary garden soil. Increased by divisions, in spring.

K. multiflora (many-flowered). *fl.* pink; peduncles slender, one, two, or rarely three-flowered; pedicels filiform. June. *l.* ovate or ovate-lanceolate, cordate-amplexicaul, acute, 2in. to 3in. long, prominently nerved. Stems ascending or erect. *h.* 9in. to 18in. Queensland and New South Wales, 1823. (B. M. 3905; L. B. C. 1511, under name of *Schelhammera multiflora.*)

KUHLIA. *See* **Fagræa.**

KUHNIA (named after Adam Kuhn, an American botanist). Ord. *Compositæ.* A monotypic genus, the species being a pretty little hardy perennial herb. It thrives in sandy loam. Increased by division, in spring.

K. eupatorioides (Eupatorium-like). *fl.-heads* cream-coloured. September. *l.* varying from broadly lanceolate and toothed to linear and entire. North America, 1812.

KUMQUAT. *See* **Citrus japonica.**

KUNTHIA DEPPEANA. *See* **Chamædorea elegans.**

KUNZEA (named after Gustav Kunze, 1793-1851, a botanist and physician of Leipsig). Ord. *Myrtaceæ.* A genus comprising fifteen species of greenhouse shrubs, often Heath-like, confined to Australia. Flowers sessile, or rarely pedicellate in the upper axils, more frequently in terminal heads, rarely an oblong spike below the end of the branch. Leaves alternate, or rarely opposite, small, entire. Probably the two species described below are the only members of the genus introduced to our gardens. For culture, *see* **Callistemon.**

K. Baxteri (Baxter's). *fl.* large, like those of a Callistemon, in dense terminal spikes; petals rich red. *l.* crowded, linear-oblong or lanceolate, flat, obtuse, or somewhat acute, about ½in. long. A rigid, minutely pubescent plant, of several feet in height. (B. R. 1838, 7, under name of *Callistemon macrostachyum.*)

K. corifolia (Coris-leaved). *fl.* white, nearly sessile, solitary in the upper axils of short leafy branchlets. *l.* linear or linear-lanceolate, usually crowded on the branchlets or clustered in the axils, ¼in. to ½in. long. A tall shrub. (L. B. C. 1998 and S. E. B. 59, under name of *Leptospermum ambiguum.*)

KYDIA (named after Colonel Robert Kyd, who died in 1794, founder and first Director of the Calcutta Botanic Garden). Ord. *Malvaceæ.* A small genus (two or three species) of slender, stellato-tomentose, stove evergreen trees, natives of India. Flowers in long panicles. Leaves palmate-nerved, entire or lobed. The species thrive in a well-drained compost of sandy peat and fibry loam. Cuttings of half-ripened shoots will root in sand, under a bell glass, in heat.

K. calycina (large-calyxed). *fl.* white or pink; involucel four-leaved, much longer than the calyx. *l.* rounded-cordate, palmately seven-nerved. 1818. (B. F. S. 3.)

K. fraterna (brotherly). *fl.* white; involucel six-leaved, shorter than the calyx. 1823.

KYLLINGA (named after Peter Kylling, 1640-1696, a Danish botanist of the seventeenth century). Syn. *Kyllingia.* Ord. *Cyperaceæ.* A rather large genus (about sixty species have been described, although scarcely twenty are sufficiently distinct to merit specific rank) of perennial or rarely annual stove herbs, broadly dispersed throughout tropical regions. Inflorescence usually in solitary heads; spikes compressed, one or two-flowered. The species are of little or no horticultural value. For culture, *see* **Cyperus.**

K. monocephala (one-headed). *fl.-heads* whitish, terminal, sessile, oval; involucre three-leaved, unequal, the largest leaf as long as the culm. *l.* sheathing, smooth, sharp-keeled. India, &c., 1868.

KYLLINGIA. *See* **Kyllinga.**

LABARIA PLANT OF DEMERARA. A common name of **Dracontium polyphyllum** (which *see*).

LABELLUM. The lip. In *Orchideæ*, and some other families, the name of Lip, or Labellum, is given to one of the divisions or lobes of the perianth.

LABELS. For indicating the names of plants and trees, either under cultivation or travelling from one place to another, the use of Labels is essential and indispensable. Those made of strong paper or parchment are largely employed for attaching to plants when packing, as they are light, and bend readily under pressure, without causing injury. The use of ink should be avoided, and blacklead pencil substituted with some sorts, otherwise the name may become obliterated, because of moisture causing the ink to run. Narrow pieces of sheet lead, with the name, or a number, punched near one end, form durable Labels, and are constantly used in some nurseries, but more extensively on the Continent. Wooden Labels are usually made of deal; but other sorts of wood are employed, such as elm, oak, and teak, when any are required to last a long time. Labels made of cast iron, zinc, iron coated with zinc, slate, porcelain, and other substances, may be procured, if desired; but scarcely one of them can equal, in neatness or general usefulness, those properly made of wood. The iron very soon rusts, and consequently requires burning and re-writing; slate and porcelain break in all directions, and are thus

Labels—*continued.*

rendered useless. Zinc is usually written on with an indelible ink, consisting of a solution of sulphate of copper, and applied with a quill pen or pointed piece of wood; but Labels made of it are frequently far from satisfactory. The sizes may be indefinite when wood is used, and, by careful painting and preparation, the Labels may be rendered very durable. If only required for ordinary use, a little white paint on one side will suffice. Any name may be easily erased with a piece of glass, and the Label used for other plants until it decays. Before permanently placing wooden Labels in the open ground, they should be painted all over and dried, adding a second coat at the time of writing, and then finally dipping the part intended for insertion in the ground into creosote, gas-tar, or any other preservative solution.

LABIATÆ. An extensive order of herbs, shrubs, or sub-shrubs, rarely arborescent or scandent, found chiefly in temperate regions of the Old World. Flowers in the axils of leaves or bracts, solitary or geminate, or in clustered centrifugal cymes, which form false whorls by their union in pairs, and are scattered, or crowded into spikes; calyx persistent, tubular, dentate, lobed or two-lipped; corolla gamopetalous; tube evolute, short, or elongated, many-formed; limb four or five-lobed; æstivation imbricate, sometimes bilabiate, the upper lip entire or emarginate, the lower three-lobed, from the upper lip being very short and deeply cleft, sometimes being bell or funnel-shaped, with four sub-equal lobes and sub-equal stamens. Leaves opposite or whorled, with pinnate reticulate nerves, exstipulate. "*Labiatæ* forms one of the most natural groups of plants; the characters of its members are so uniform that it may be called monotypic, as if all the species could be comprehended in a single genus, and the discrimination of its genera is hence often very difficult" (Decaisne and Le Maiout). Many of the genera yield a valuable oil. Basil, Horehound, Hyssop, Lavender, Marjoram, Mint, Patchouly, Rosemary, Sage, Savory, and Thyme, belong to this order. There are about 140 genera and 2600 species. The following are examples: *Æolanthus, Anisochilus, Coleus, Cunila, Hyssopus, Lamium, Lophanthus, Perilla, Salvia.*

LABIATE. "A term applied to that form of a monopetalous calyx or corolla which is separated into two unequal divisions, the one anterior, and the other posterior, with respect to the axis."

LABICHEA (named after M. Labiche, an officer of the French ship "Uranie," who accompanied Freycinet in his voyage round the world). ORD. *Leguminosæ.* A genus of five species of unarmed greenhouse evergreen shrubs or sub-shrubs, natives of Australia. Flowers yellow, in axillary, often few-flowered, racemes; sepals and petals sometimes only four; stamens two. Leaves impinnate, or reduced to the terminal leaflet. Labicheas thrive in a compost of peat and loam. Cuttings of half-ripened shoots will root, during summer, in sand, if placed under a bell glass. The following is the only species now in cultivation.

L. diversifolia (various-leaved). A synonym of *L. lanceolata.*

L. lanceolata (lance-shape-leaved). *fl.* bright golden-yellow; base of the upper petal stained with red; raceme about six-flowered. April to June. *l.*, leaflets narrow-linear or lanceolate, terminating in a sharp spiny point. *h.* 6ft. Western Australia, 1840. A compact bushy plant. (B. M. 6751.) SYN. *L. diversifolia* (under which name it is figured in L. & P. F. G. 52).

LABILLARDIERA. A synonym of *Billiardiera.*

LABIOSE. Applied to a polypetalous corolla which has the appearance of being labiate.

LABISIA (from *labis*, a spoon; in allusion to the form of the corolla divisions, which resemble the bowls of small spoons). Spoonflower. ORD. *Myrsineæ.* A genus comprising three or four species of very glabrous or

Labisia—*continued.*

puberulous, small stove shrubs, with the habit of *Pothos*, confined to the Malayan Archipelago. Flowers white, minute, in terminal, elongated, fasciculate racemes. Leaves few, sessile or petiolate, lanceolate, acuminate, entire or denticulate; petiole or base of leaf sheathed. The undermentioned is probably the only species grown in our gardens. It should be potted in sandy loam, to which a little rough peat is added, and placed in a humid atmosphere, with a gentle bottom heat. Plenty of water should be applied to the roots; and overhead syringings, in fine weather, will prove beneficial. Propagation may be effected by seeds.

L. pothoina (Pothos-like). *fl.* white, small, each lobe of the corolla resembling the bowl of a small spoon. June. *l.* palmate, slender, entire or denticulate; petioles swollen at base, decurrently articulated with the stem. Stem 1ft. or more high. (B. R. 1845, 48.)

LABLAB (*Lablab* is the Arabic name of *Convolvulus*). ORD. *Leguminosæ.* This genus contains a few species, the one best known being that described below, which is widely cultivated throughout many tropical countries as a food plant; its pods and seeds being eaten as are kidney beans and haricots amongst us. For culture, *see* **Dolichos.**

L. vulgaris (common). *fl.* violet. June. *l.*, leaflets roundish-ovate, ending in a point furnished with a bristle. India, 1794. Stove climber. Now included under *Dolichos*, the correct name being *D. Lablab* (under which name it is figured in B. M. 896). SYN. *Lablavia vulgaris* (S. B. F. G. ser. ii. 236).

LABLAVIA VULGARIS. *See* **Lablab vulgaris.**

LABOUCHERIA. A synonym of *Erythrophlœum.*

LABRADOR TEA. *See* **Ledum.**

LABURNUM (the old Latin name used by Pliny). ORD. *Leguminosæ.* A genus comprising only three species of hardy, glabrous or puberulous trees or shrubs, natives of Europe and Asia Minor. Flowers yellow,

FIG. 365. FLOWERING BRANCHLET OF LABURNUM ALPINUM.

disposed in terminal racemes; calyx shortly toothed; lip ovate or orbiculate. Leaves digitately three-foliolate. The species are readily raised from seed, and the varieties easily propagated by grafting or budding on the

Laburnum—*continued.*

common sorts. Laburnums thrive in almost any soil or situation. The genus was formerly included under *Cytisus*.

L. Adami (Adam's).* *fl.* dull purplish, disposed in long pendulous racemes. This remarkable graft hybrid is said to have been raised by Jean Louis Adam, in 1825, by shield-grafting *Cytisus purpureus* on *L. vulgare*. A most extraordinary thing in connection with it is the complete reversion of some parts of the same tree to one or the other of the parents. SYN. *Cytisus Adami*.

L. alpinum (alpine).* Scotch Laburnum. *fl.* yellow; racemes pendulous; pedicels and calyces puberulous. June. Pod shorter than that of *L. vulgare*, smooth, with distinctly-winged upper suture. *l.* petiolate, glabrous; leaflets ovate-lanceolate, rounded at the base. Branches terete. *h.* 15ft. to 20ft. Europe, 1596. Hardy tree. SYN. *Cytisus alpinus*. See Fig. 355. *C. fragrans*, *C. hirsutum*, and *C. pendulum* (a form with pendent branches), are varieties.

L. caramanicum (Caramanian). *fl.* large, in erect racemes, arranged in panicles. June. *l.* small, shortly stalked. *h.* 3ft. to 4ft. Asia Minor, 1879.

L. vulgare (common).* Common Laburnum; Golden Chain. *fl.* yellow; racemes pendulous, simple; pedicels and calyces clothed with adpressed pubescence. April to June. Pod clothed with hairs; upper suture thickened and keeled, but not winged. *l.* petiolate; leaflets ovate-lanceolate, pubescent beneath. Branches terete, whitish. *h.* 20ft. Southern France to Hungary, 1596. SYN. *Cytisus Laburnum* (under which name it is figured in B. M. 176). The following are the best varieties of this very beautiful spring-flowering tree:

L. v. aureum (golden). An interesting variety, with golden-yellow leaves.

L. v. Carlieri (Carlier's). A free-flowering form, with very narrow leaflets and long racemes.

L. v. involutum (curled). A vigorous grower, with the leaflets curled so as to form "rings."

L. v. Parkesii (Parkes'). Racemes very long; flowers deeper-coloured than those of the type. An excellent variety, raised about 1840.

L. v. quercifolium (Oak-leaved). Leaflets sinuated and lobed, so as to resemble a miniature Oak-leaf in outline.

L. v. Watereri (Waterer's). For length of raceme, depth of colour, and floriferousness, this is, perhaps, the best of all the varieties.

LAC. A fluid having an opaque appearance, and occurring in many plants.

LACÆNA (a Greek adjective, meaning native of Lacedæmon; one of the names of Helen of Troy, which was applied to this genus on account of its beauty). ORD. *Orchideæ*. A genus of two species of stove epiphytal orchids, natives of Central America. They are very closely allied to *Lycaste* and *Anguloa*. For culture, *see* **Acineta.**

L. bicolor (two-coloured). *fl.* greenish-yellow, streaked and spotted with violet and dark purple. May. *h.* 1ft. Guatemala, 1843. (B. R. xxx. 50.)

L. spectabilis (showy). *fl.* pinkish-white, dotted with small spots, 1in. in diameter; lip having the central one of the three lobes prolonged into a stalked spade-shaped body, thickly dotted; spikes loose, pendulous. May. *l.* elliptic. Pseudo-bulbs oblong-ovoid. *h.* 6in. Mexico, 1853. (B. M. 6516.)

LACE BARK OF JAMAICA. *See* **Lagetta lintearia.**

LACEPEDEA. A synonym of **Turpinia** (which see).

LACERATE. Torn; having a torn appearance.

LACEWING FLIES. These are frequently called Golden-eyes (*Chrysopa vulgaris*, &c.). They belong to the *Neuroptera*. The flies have usually slender bodies, and rather large, delicate wings, reaching from 1in. to 1¾in. in their span. The whole insect is usually green, varying in depth, often tinted with yellow; the eyes are very brilliant, resembling small golden-yellow beads. The eggs are attached, by means of long hair-like stalks, to a branch, many near one another, and have more than once been mistaken for the fruits of a moss. The larvæ are ½in. long, oval in form, and depressed, and have strong jaws, six jointed legs, and hairs along the sides of the body. They live on Aphides, sucking their victims dry, and casting away the skins. These insects have a most

Lacewing Flies—*continued.*

unpleasant smell; hence they are often known as Stink Flies. An allied genus, *Hemerobius*, includes several species, similar in form to *Chrysopa*, but smaller, seldom exceeding 1in. in span of wings, and with the body and wings of a brown or grey colour. It is like *Chrysopa* in feeding, while young, on Aphides, but the larvæ clothe themselves with the skins of the Aphides killed by them. Both genera are rather common.

LACHENALIA (named after W. de Lachenal, 1736-1800, Professor of Botany at Basel). ORD. *Liliaceæ*. A rather large genus (about thirty species) of greenhouse bulbous plants, natives of South Africa. Flowers sessile, spicate, or in pedicellate racemes, erect, spreading, or pendulous; perianth tubular or almost campanulate; scape simple, leafless. Radical leaves two (or, in a few species, three to five), rather thick, oblong, lorate, linear, or sub-terete, often spotted or pustulate. Bulbs tunicated. Lachenalias are among the most distinct and beautiful of dwarf bulbous plants for greenhouse decoration. Some of the species are very rare; but, fortunately, one of the best, *tricolor*, is plentiful, and is that most commonly seen. *L. aurea* (a variety of *L. tricolor*) and *L. Nelsoni* are also extra fine—especially the latter—and worthy of the most extensive cultivation so soon as the stock, which is now somewhat limited, admits. The flowering season, with most species, is spring and early summer; that of a few of the rarer kinds being, however, dispersed throughout the year. Propagation is effected by the increase of bulbs round those of the previous year, which also remain good. *L. tricolor* increases very rapidly, and all of its bulbs, except the smallest, flower the following season.

Cultivation. About the beginning of August is the best time for the annual repotting. The whole stock of any species to be grown should be taken out of the dry soil in which the bulbs are usually kept while at rest, and placed together in order that the large and smaller sizes may be selected, and grown separately, to produce spikes uniform in strength in each pot. Efficient drainage must be provided, and the compost here recommended is two parts loam to one of leaf soil and dried cow manure; some sharp river sand or road grit being also added, to insure the free passage of water. The bulbs should be placed in the pots or pans in which they are intended to flower, as no further repotting will then be necessary. Pans from 9in. to 12in. in diameter are well adapted for Lachenalias, where they are procurable, and there is a sufficient stock to fill them. Pots 5in. in diameter are those best suited, and about six bulbs should be placed in each. Select the strongest for the pans, and cover, in either case, with ½in. of soil. Place them afterwards on a moist bed of ashes, in a cool, shallow pit or frame, where frost is merely excluded in winter. A good watering may be given at first, to settle the soil; but scarcely any more will be needed until growth commences. Air and all possible light must be admitted throughout the winter, to induce a sturdy growth, and extra room should be allowed as the plants require it. It is advisable to give air to Lachenalias on all favourable occasions in winter, as they soon become drawn in a close or warm atmosphere. Cold draughts disfigure the foliage, particularly in February and March, causing a stunted growth; consequently, in airing, special care must be taken. A little artificial manure may be applied with advantage so soon as the flower-spikes can be seen. This is preferable to the use of manure water, as the latter can scarcely be kept off the leaves, or from lodging in their axils, to the detriment and injury of the flowers. Forcing is sometimes recommended, but it should not be practised unless a quantity of plants are at hand to keep a succession; all Lachenalias being very much sturdier and better when kept altogether in a cool place, away from the drying influences of fire heat. When in flower, they present a much finer appearance in a green-

Lachenalia—*continued.*

house, if arranged in masses, than when isolated as single pots or pans of plants. Each of the bulbs, if strong, will produce from one to four flower-spikes, and these keep in excellent condition, in a cool house, for nearly two months. When flowering is over, the plants should be placed in the full sun, to insure a thorough ripening; and when the leaves die away, the bulbs may be stored, and kept quite dry until starting time returns. Provided the following primary and important points are followed, the successful culture of Lachenalias becomes an easy matter: Prepare a rich, open soil; apply but little water in winter, until growth is somewhat advanced, but give plenty afterwards; admit all possible light and air, and, at the same time, avoid draughts and the use of fire heat, except that necessary for excluding frost and dispelling damp.

L. anguinea (serpent). *fl.* whitish, tubular-campanulate; racemes about twenty-flowered; scape spotted. April. *l.* always solitary, lanceolate, fleshy-herbaceous, 6in. to 7in. long, 1in. broad, spotted. *h.* [illegible]in. [illegible]. (L. & P. F. G. ii. 179.)

L. angustifolia (narrow-leaved). A synonym of *L. contaminata.*

L. aurea (golden). A synonym of *L. tricolor lutea.*

L. bifolia (two-leaved). A synonym of *L. isopetala.*

L. contaminata (contaminated). *fl.* white, often more or less tinged with red, densely sub-spicate, campanulate. March. *l.* six to ten, semi-terete, 3in. to 8in. long, often spotted, channelled. *h.* 2in. to 6in. 1774. (B. M. 1401.) SYN. *L. angustifolia* (B. M. 735).

L. fistulosa (fistular). *fl.* fragrant; calyx white, tinged with sky-blue; sepals brown at tip; petals white, edged with purple; spike loose, 2in. long; scape as long as the leaves. *l.* two, lanceolate, fleshy, unguiculate, 4in. long, 3in. broad. 1884.

L. fragrans (sweet-scented).* *fl.* reddish, very fragrant; racemes about twenty-flowered. May. *l.* two, oblong-ovate, green. *h.* 6in. 1798. (A. B. R. 302.)

L. glaucina (milky-green). *fl.* white, more or less tinged with yellow or red, sub-spicate. May. *l.* two, rarely three, fleshy-herbaceous, lanceolate; margins cartilaginous, often spotted. *h.* 5in. to 6in. 1795. (B. M. 3002.) SYN. *L. sessilifolia* (A. B. R. 460).

L. isopetala (equal-petaled). *fl.* white, or more or less tinged with red. May. *l.* two, fleshy-herbaceous, lorate-lanceolate, acute, 6in. to 9in. long. *h.* 4in. to 8in. 1804. SYNS. *L. bifolia* (B. M. 1611), *L. rosea* (A. B. R. 296.)

L. lilacina (lilac).* *fl.* about twenty in an oblong spike; calyx bright lilac, blue at base; petals same colour, widely spreading; sepals ovate-oblong; scape 4in. to 5in. long, greenish-red, mottled with red-brown. *l.* two, lanceolate, falcate, 4in. long, ½in. to ¾in. broad. 1884.

L. lucida (shining). *fl.* white, tinged with yellow or red, sweet-scented; racemes ten to fifteen-flowered. April. *l.* two, fleshy-herbaceous, lanceolate, 5in. to 6in. long, 1in. broad, smooth. *h.* 4in. to 6in. 1798. (B. M. 1372.) SYN. *L. pallida* (B. R. 287).

L. mutabilis (changeable). A synonym of *L. orchioides.*

L. Nelsoni (Nelson's).* This is a very handsome hybrid, having golden-yellow flowers, numerously disposed in long racemes. [illegible] (F. M. n. s. [illegible].)

L. nervosa (nerve-leaved). *fl.* whitish, tinged with green and red, tubular-campanulate; racemes twenty to thirty-flowered. June. *l.* two, fleshy-herbaceous, ovate-oblong, spreading, abundantly nerved, smooth, or rarely slightly blistered. *h.* 3in. to 6in. 1810. (B. M. 1497.)

L. odoratissima (very sweet-scented). *fl.* in a rather dense raceme; sepals white, with a green tip; petals very spreading at the tips; scape shorter than the leaves. *l.* two, lanceolate, falcate, fleshy, blistered over the face, 6in. long, ½in. to ¾in. broad. 1884.

L. orchioides (Orchis-like). *fl.* whitish or yellowish, or more or less tinged with red or blue, sub-spicate, fragrant, closely set on a spotted scape 9in. long. April and May. *l.* two, or rarely three, lanceolate, fleshy-herbaceous, dark green, often spotted, with cartilaginous margins; scape 3in. to 9in. high, often spotted. 17[illegible]. This species exhibits considerable variation in the colouring of its flowers. (B. M. 854, 1269; Ref. B. 171.) SYNS. *L. mutabilis* (S. B. F. G. ser. ii. 129; L. B. C. 1076), *L. pulchella.*

L. pallida (pale). *fl.* whitish, or more or less tinged with red, sub-spicate. May. *l.* two, fleshy-herbaceous, lanceolate, 6in. to 12in. long, with cartilaginous margins. *h.* 6in. to 9in. 1782. This is scarcely more than a large variety of *L. glaucina.* (B. R. 1350, 1945; Ref. B. 170.)

L. pallida (pale). A synonym of *L. lucida.*

L. pendula (drooping).* *fl.* of a deep purple, red, and yellow colour, about 1in. long, closely and gracefully set on the stout and spotted scape. April. *l.* erect, lorate-lanceolate, dark green, sometimes slightly spotted. *h.* 4in. to 9in. 1789. A strong-growing and very handsome species; probably the largest and showiest of the whole genus. (A. B. R. 41; B. M. 590.)

Lachenalia—*continued.*

L. pulchella (pretty). A synonym of *L. orchioides.*

L. purpureo-cærulea (purplish blue).* *fl.* purplish blue, campanulate; racemes thirty to forty flowered. April. *l.* two, rarely three, fleshy herbaceous, lanceolate, blistered, 6in. to 8in. long, [illegible]in. broad. *h.* 6in. to 9in. 1789. (A. B. R. 251; B. M. 745.)

L. pustulata (blistered). *fl.* whitish, sub-spicate; scape nearly equalling the leaves. February. *l.* two, fleshy-herbaceous, lanceolate, 6in. to 9in. long, blistered. *h.* 1ft. 1799. (A. B. R. 350; B. M. 817.)

L. quadricolor (four-coloured). A synonym of *L. tricolor.*

L. q. lutea (yellow). A synonym of *L. tricolor lutea.*

L. racemosa (raceme-flowered). *fl.* whitish, slightly tinged with red; racemes twelve to twenty-flowered; scape slightly spotted. May. *l.* two, rarely three, fleshy-herbaceous, lanceolate, thickly blistered. *h.* 3in. to 4in. 1811. (B. M. 1517.)

L. rosea (rosy). A synonym of *L. isopetala.*

L. rubida (reddish). *fl.* ruby-red, tube-shaped, on a thickly-spotted scape 6in. long. September. *l.* lanceolate, in twos, slightly spotted. *h.* 9in. 1803. (B. M. 993.) This species has two varieties, *tigrina* and *punctata*, in which the flowers are of a pale ground-colour, thickly spotted with deep red.

L. serotina (late-flowering). A synonym of *Dipcadi serotina.*

L. sessilifolia (sessile-leaved). A synonym of *L. glaucina.*

L. tricolor (three-coloured).* *fl.* bright green, red, and yellow, about 1in. long, disposed all along the upper part of the erect scape. Spring. *l.* in twos, lorate lanceolate, spreading, dark green, spotted with dull purple. *h.* 1ft. 1774. (B. M. 82.) SYN. *L. quadricolor* (A. B. R. 148).

L. t. lutea (yellow).* This is a form with the perianth altogether yellow. SYNS. *L. quadricolor lutea* (B. M. 1704), *L. aurea.*

L. unifolia (one-leaved). *fl.* white, in many-flowered racemes; pedicels two to three lines long. March. *l.* always solitary, fleshy-herbaceous, linear, 6in. to 12in. long, with blood-coloured blotches or spots. *h.* 4in. to 15in. 1795. (B. M. 766.)

L. violacea (violet). *fl.* white, tinged with violet and green, tubular-campanulate. March. *l.* two, fleshy-herbaceous, lorate, 8in. to 9in. long, 1½in. broad, smooth, spotted. *h.* over 1ft. 1795. (L. B. C. 1129, under name of *L. bicolor.*)

LACHNÆA (from *lachnaos*, downy; referring to the downy clothing of the flower-heads). ORD. *Thymelaceæ.* A genus of eighteen species of greenhouse evergreen shrubs, natives of the Cape of Good Hope. Flowers in terminal heads, frequently surrounded by bracts; perianth coloured, tubular, four-cleft. Leaves opposite or scattered. Lachnæas thrive in a sandy-peat soil, and require a somewhat sheltered and shady situation. Propagated, in spring, by cuttings of short young shoots, placed in sand, under a bell glass.

L. buxifolia (Box-leaved).* *fl.-heads* white, woolly. May to July. *l.* oval, sessile, very smooth. *h.* 2ft. 1800. (B. M. 1657).

L. b. glauca (glaucous). *fl.-heads* white, woolly. May to July. *l.* scattered, elliptical, ovate. *h.* 2ft. 1800. (B. M. 1658.)

L. conglomerata (clustered). *fl.-heads* white, clustered. June and July. *l.* loose. *h.* 2ft. 1773.

L. eriocephala (woolly-headed). *fl.-heads* white, solitary, woolly, imbricated in four rows. June and July. *h.* 2ft. 1793. (B. M. 1295.)

L. purpurea (purple).* *fl.-heads* purple, smooth. June and July. *l.* opposite. *h.* 2ft. 1800. (B. M. 1594.)

LACHNANTHES (from *lachne*, down, and *anthos*, a flower; in allusion to the woolly flowers). SYNS. *Gyrotheca* and *Heritiera* (of Gmelin, not of Aiton). Red-root. ORD. *Hæmodoraceæ.* A monotypic genus. The species is a half-hardy, marsh or aquatic, herbaceous perennial, the roots of which yield a red dye. It thrives in a peat and loam compost, and may be increased by dividing the roots, in spring.

L. tinctoria (dyer's). *fl.* dingy yellow, within loosely woolly, disposed in a dense, compound, terminal cyme. July. *l.* sword-shaped, clustered at the base, and scattered on the stem, which is hairy above. *h.* 1½ft. Southern United States (in sandy swamps), 1812.

LACHNOSTOMA (from *lachne*, wool, and *stoma*, a mouth; in allusion to the bearded corolla throat. SYNS. *Chthamalia, Ibatia, Pherotrichis.* ORD. *Asclepiadeæ.* A genus comprising about sixteen species of stove or greenhouse, twining or prostrate, pubescent or villous, shrubby herbs, inhabiting tropical, and the warmer parts of North, America. Flowers often rather small; cymes contracted, two or few-flowered, or rarely umbellately

Lachnostoma—*continued.*

many-flowered. Leaves opposite, often cordate. The undermentioned species—probably the only one in cultivation—requires culture similar to **Gonolobus** (which *see*).

L. maritimus (sea-loving). *fl.*, corolla green at back and edge, purple in the middle; umbels sessile, few-flowered, between the petioles. June and July. *l.* downy, cordate, acuminate, with the recess of the base open; petioles as long as the leaves. Stems densely downy backwards. Caracas, &c. An inelegant twiner. (B. R. 931, under name of *Gonolobus maritimus*.)

LACINIATE. Jagged; cut or divided into unequal segments.

LACISTEMACEÆ. A natural order of shrubs or small trees, all natives of tropical America, extending from Brazil and Peru as far as the West Indies and Mexico. Inflorescence of axillary, solitary, or fascicled spikes; perianth of two to six (usually four) petaloid segments, persistent. Leaves alternate, shortly petiolate, entire, penniveined; stipules none. The order contains but one genus, *Lacistema*, and sixteen species.

LACKEY MOTH (*Bombyx Neustria*). These insects vary considerably in colour, but the upper wings are usually brown, tinged with red or yellow, crossed by a darker band margined with pale bars; the fringes along the hind margin are alternately pale and dark. The lower wings are usually red-brown, with an indistinct paler crossbar. The female lays her eggs on the twigs of various trees, such as Apple, Oak, Elm, &c., in spirally-arranged groups, each about ½in. long (see Fig. 366). When the larvæ emerge from the eggs in spring, they are black. For a considerable time, they live in society, spinning a web over the branches and leaves. From the web they go out to feed on the neighbouring branches, but return to it in wet weather, and in the evening; and often they may be seen sunning themselves on its surface. When nearly full fed, they wander apart from one another, to seek out a suitable place—between leaves, among rubbish, in crevices of bark, or elsewhere—to spin an oblong yellow

Lackey Moth—*continued.*

cocoon, with which a sulphury powder is plentifully mixed. When nearly mature, the larvæ are gaudily coloured—the head is blue-grey, with two black spots, like eyes; the next segment is blue-grey, with four black spots; the other segments are alike, striped with white down the middle of the back, and with orange-red, blue, and black, on the sides. The pupa is smooth and brown. The moths emerge in July. The Lackey Caterpillars seldom do serious harm, except when they attack the Apple-tree; and they never seem to be so hurtful in England as they are at times in France and Germany. They have not been recorded from Scotland.

Remedies. The best is hand-picking. The eggs, when noticed on the branches, should be destroyed; but the best success follows the removal of branches bearing the webs and the young larvæ, since these webs are readily seen. Something should be held below, to catch larvæ that may drop off. They may also be shaken off the branches, and crushed below the trees. The ground should be kept clear of weeds and other cover for such as fall, or are seeking for a safe shelter in which to spin their cocoons, and to become pupæ.

FIG. 366. LACKEY MOTH (BOMBYX NEUSTRIA).

LACOSTEA. Included under **Trichomanes** (which *see*).

LACTESCENT. Containing lac, or milk.

LACTUCA (the old Latin name, from *lac*, milk; in reference to the milky juice). Lettuce. Including *Mulgedium*. ORD. *Compositæ*. A genus comprising about sixty species of hardy, and usually weedy, annuals or perennials, natives of the temperate regions of the Northern hemisphere and South Africa, only a few of which are worth growing. Flower-heads blue or yellow; involucre of few bracts, in several series, placed upon a flat, naked receptacle. Fruits somewhat flattened, surmounted by a long, slender beak, and a pappus of long, silky, silvery hairs. Leaves radical or alternate, entire, largely dentate or pinnatifid; margins setose-ciliate or naked. Stems erect, branching. Lactucas thrive in a deep but light or sandy loam, and

Lactuca—*continued.*

may be increased by divisions of the roots, or by seeds. All the species of *Lactuca* abound in a milky juice, which partakes, in a considerable degree, of the qualities of opium. The production of this juice is lessened by culture, and especially by blanching. It is most abundant in plants in a wild state, and in both wild and cultivated Lettuce during inflorescence. It is from the juice of the Lettuce that the late Dr. Duncan, of Edinburgh, prepared the drug called Lactucarium, which is occasionally used as a mild narcotic or sedative where opium is not admissible. *See also* **Lettuce.**

L. alpina (alpine).* *fl.-heads* purplish-blue, large, numerous, disposed in a corymbose cluster. July. *l.* somewhat lyrate, the terminal lobe triangular and very large. Stems furrowed, erect, smooth below, hairy above. *h.* 3ft. Arctic and Alpine Europe, West Siberia, and Scotland (but very rare). Perennial. A handsome plant for a somewhat shaded position, in very moist, deep, loamy soil. (Sy. En. B. 809, under name of *Mulgedium alpinum.*)

L. macrophylla (large-leaved). *fl.-heads* pinkish-purple, large, corymbose. July. *l.* radical, large, cordate. Stems stout. *h.* 4ft. Caucasus. A noble species.

L. macrorhiza (large-rooted).* *fl.-heads* bright light violet-purple, about 1in. in diameter, and disposed in loose corymbs. Autumn. *l.* variously formed, sometimes lyrate-pinnatifid, with one or two pairs of lateral lobes, and a large, roundish, terminal one; sometimes very slightly lyrate-pinnatifid, and at other times oblong; those of the stem with broad amplexicaul auricles. *h.* 6in. to 3ft. Himalayas. Perennial. (B. R. xxxii. 17, under name of *Mulgedium macrorhizon.*)

L. perennis (perennial). *fl.-heads* light blue, in corymbose panicles. June to August. *l.* all pinnatifid; segments linear, toothed upwards. *h.* 2ft. South Europe, 1596. (B. M. 2130.)

L. Plumieri (Plumier's). *fl.-heads* purple, disposed in large, spreading, terminal corymbs, with short bracts. Summer. *l.* broad, large, pinnatifid-runcinate, glaucous underneath. *h.* 6ft. South of France. A handsome perennial, like *L. alpina*, but larger and more ornamental.

L. sativa (cultivated). Common Lettuce. *fl.-heads* pale yellow, disposed in corymbs on a stem about 3ft. high. June. *l.* large, roundish or roundish-oblong, entire, slightly toothed, milky. *h.* 4ft. Generally considered to be a cultivated race derived from *L. Scariola*, a widely-distributed weed. Annual. (B. M. Pl. 161.)

L. tuberosa (tuberous).* *fl.-heads* pale blue, over 1in. across, disposed in loose panicles. Autumn. *l.* about 1ft. long, 9in. wide, runcinate-pinnatifid, with lanceolate, somewhat recurved, finely-toothed lobes. *h.* 1ft. to 1½ft. An ornamental perennial, with a neat habit. Tauria.

LACUNA. An intercellular space, circumscribed by a great many cells.

LACUNOSE. Having numerous large, deep excavations.

LADYBIRDS (*Coccinella*). These are a group of small beetles of very great value to horticulturists,

FIG. 367. GRUB OF SEVEN-SPOTTED LADYBIRD (enlarged).

inasmuch as the larvæ (see Fig. 367) feed on Aphides, and aid much in limiting their ravages. The *Coccinellidæ* have never more than three distinct joints in the tarsi, have antennæ shorter than the thorax, and are usually hemispherical in form. The legs are short, and are seen very little beyond the wing-cases. The species are numerous, but form a very natural assemblage in respect of structure, though the individual species are so variable in colour as to have been often described under several names. They excrete, from the joints of the legs, drops of a yellowish fluid with a disagreeable smell. At times, Ladybirds appear in countless swarms, especially after severe attacks of Aphides on Hops or other cultivated plants. They are commonly red with black spots, but vary in size and number of spots, and may be black with red spots, or unspotted red or black, or more or less marked with yellow. Among the commoner species are:

Ladybirds—*continued.*

C. septempunctata (Seven-spotted Ladybird, see Fig. 368), *C. bipunctata* (Two-spotted), *C. undecimpunctata* (Eleven-

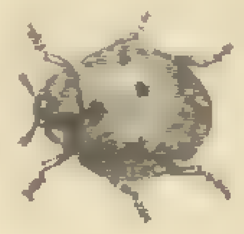


FIG. 368. SEVEN-SPOTTED LADYBIRD.

spotted), and *C. variabilis*. In Roman Catholic times, in Britain, these insects were regarded as sacred to the Virgin: hence the name Ladybirds, or Ladycows.

LADY FERN. *See* **Asplenium Filix-fœmina.**

LADY'S GARTERS. A name applied to the striped garden variety of **Phalaris arundinacea** (which see).

LADY'S MANTLE. *See* **Alchemilla.**

LADY'S SLIPPER. *See* **Cypripedium Calceolus.**

LADY'S SMOCK. *See* **Cardamine.**

LÆLIA (named after a vestal virgin of that name, because of the delicacy of the flowers). SYN. *Amalias*. ORD. *Orchideæ*. A genus comprising about twenty species of beautiful stove orchids, natives of the warmer parts of America, from Brazil to Mexico. They are closely allied to *Cattleya*, and are distinguished principally therefrom in having eight pollen masses. Flowers numerous or few, on terminal scapes. Leaves thick, hard. Pseudo-bulbs often elongated, clavate, and stem-like. For culture, &c., *see* **Cattleya.**

L. acuminata (pointed-lipped). *fl.* 1in. to 2in. across; sepals and petals pure white; lip white, with a dark blotch on the upper part; spikes five or six-flowered, 1ft. to 1½ft. long. December and January. *l.* solitary, oblong, thick. Pseudo-bulb rather roundish in outline, and flat. Mexico, 1840. (B. M. 4905.) There is a pretty variety of this species, with delicate rosy-violet flowers.

FIG. 369. FLOWER OF LÆLIA ALBIDA.

L. albida (whitish).* *fl.* very fragrant, 1½in. to 2in. across; sepals and petals mealy-white; lip white, or pale pink, streaked in the centre with lines of yellow; scape slender, from the top of the

Lælia—*continued.*

pseudo-bulb, from 1ft. to 2ft. long, and three to six-flowered. December and January. *l.* ligulate, coriaceous, dark green, usually in twos. Pseudo-bulbs roundish, clustered. Guatemala, 1838. See Fig. 369. (B. M. 3957.) There are several forms of this handsome species, some producing much larger flowers, with broader petals, than the type, while, in others, the sepals and petals are of a deep flesh-colour, with a rich mauve lip. The following varieties are especially worthy of mention:

L. a. brunnea (brown). *fl.*, sepals and petals, and the anterior part of the lip, of a fine chestnut-brown; base of lip marked with beautiful purplish veins. Mexico, 1868. A handsome, neat, and useful variety.

L. a. Marianæ (Marian's). *fl.*, sepals and petals flesh-colour, changing to salmon; lip mauve, with buff stripes. A very pretty cool-house variety, with compact habit, and pale green foliage.

L. a. ochracea (ochreous). *fl.*, sepals and petals pallid brown; lip with a white disk, washed with purple in front of the column, and with purplish veins on the lateral segments; the anterior part brownish. Mexico, 1868.

L. a. rosea (rosy). *fl.* tipped with purple. Mexico, 1869. (F. M. 335.)

L. a. Tuckeri (Tucker's). *fl.* amethyst, purple, and yellow. Mexico, 1868.

L. anceps (two-edged).* *fl.* fragrant, 2in. to 4in. across; sepals and

FIG. 370. FLOWER OF LÆLIA ANCEPS.

petals rose-lilac; lip deep purple, shaded with lilac; scape three to six-flowered. December and January. *l.* solitary, or in pairs, broadly lanceolate, bright shining green. Pseudo-bulbs ovate, somewhat four-angled, from 4in. to 6in. long. Mexico, (about) 1834. This thrives on a block, but, as it attains to a considerable size, its weight renders it best adapted for pot cultivation. Large specimens are remarkably handsome, producing as many as twenty scapes of flowers. See Fig. 370. (B. M. 3804; B. R. 1751.) There are several varieties of this very handsome cool-house orchid, varying principally in the intensity of colour, or in the number of flowers which are borne upon the scape. The following are well worth cultivating:

L. a. alba (white).* *fl.* pure white; lip with a few yellow streaks. Mexico.

L. a. Barkeriana (Barker's).* *fl.* purple. Mexico, 1833. Very scarce.

L. a. Calvertiana (Calvert's). A fine variety, somewhat like *Dawsoni*, but with narrower petals, a rose border to the side lobes of the lip, and the front lobe wholly red-purple. 1883.

Lælia—*continued.*

L. a. Dawsoni (Dawson's).* A distinct, beautiful, and rare variety, with little if anything in its growth to distinguish it from the normal state of the type; but the inflorescence cannot be mistaken for any other species or variety. The sepals and petals are of a pure waxy-white; the lip is three-lobed, the side lobes being white, and the centre one purple streaked with lines of a deeper purple; the ridge, as in the normal state, being yellow Mexico, 1868. (F. M. 530.)

L. a. delicata (delicate).* *fl.*, sepals and petals white, stained with rosy-purple; lip white, suffused with reddish-purple and shaded with violet, the throat being orange-yellow; spikes four to six-flowered. Mexico. A distinct and handsome form.

L. a. Hilliana (Hill's). A distinct variety, with the front lobe of the lip two-lobed, and with a deep orange-coloured disk

L. a. Leeana (Lee's).* *fl.*, sepals and petals rose-coloured, narrow; lip white, with the tips of the lateral lobes, and some veins, of a rich purple. 1882. A handsome variety.

L. a. pulcherrima (very handsome). *fl.*, lip truncate at tip; lateral angles and front third of middle lobe mauve-purple; disk light orange, with purple-brown veins. 1883.

L. a. rosea (rosy). *fl.* bright rose; disk of lip yellow, marked with dark lines. Mexico, 1880.

L. a. vestalis (vestal). A very fine broad-petaled variety, with white flowers, having the callus, disk, and bases of the side lobes, of a deep shining sulphur-colour. 1880.

L. a. Warnerii (Warner's).* *fl.*, sepals and petals light soft rose; lip of an intense crimson. June and July.

L. a. Wolstenholmæ (Mrs. Wolstenholm's). *fl.* medium-sized; sepals and petals light amethyst, the former dotted on the edges with purple, the latter margined with purple; lip wholly deep purple. A handsome variety.

L. autumnalis (autumnal).* *fl.* very finely fragrant; sepals lanceolate, spreading, and petals oblong-lanceolate, waved at the edges, both being of a beautiful soft rose-colour; lip three-lobed, rosy-white, with a yellow centre; scape about 1ft. high, terete, three to six-flowered. December and January. *l.* two or three, linear-oblong, spreading, coriaceous, bright green. Pseudo-bulbs ovate, ribbed, tapering to the apex. Mexico, 1838 A handsome species, thriving best on a block, and requiring plenty of moisture when young. (B. M. 3817; B. R. 1839, 27.)

L. a. atrorubens (dark red).* *fl.* rich reddish or magenta-purple, deepest toward the tips of sepals and petals, especially so on the upper part of the lip, while the lower is almost pure white, and does not clasp the column, as in other species; sepals and petals revolute at tips; peduncles long. Pseudo-bulbs short.

L. callistoglossa (very beautiful-lipped). *fl.*, sepals and petals rose-colour; lip having the disk whitish, with purple lines, and the front part of a warm dark purple. 1882. A garden hybrid between *L. purpurata* and *Cattleya Warscewiczii*. Of this very fine and distinct plant, there are several varieties, some of them having much richer-coloured flowers.

L. caloglossa (beautiful-lipped).* *fl.* light purple; lip with an anterior, crisp, crenulate disk, dark-purplish, bordered with white; lateral edges light purplish. Gardens, 1877. A lovely hybrid.

L. cinnabarina (scarlet-flowered).* *fl.* orange-scarlet, with a crispy lip; scape erect, 1ft. to 1½ft. high, three to five-flowered. March. *l.* usually solitary, erect, dark green, from 4in. to 6in. long. Pseudo-bulbs thick and rounded at the base, somewhat flask-shaped. Brazil, 1836. This fine species is best suited for pot culture. (B. M. 4302.)

L. crispilabia (curled-lipped). *fl.* rosy-purple; lip finely crisped or undulate; scape from 12in. to 16in. long, and three to five-flowered. *l.* solitary, ligulate. Pseudo-bulbs pyriform. Mexico, 1867. A very free-flowering species, known in gardens as *L. Lawrenceana*. (W. S. O. ser. ii. 6.)

L. Dayana (Day's).* *fl.*, sepals and petals rosy-purple; lip rich purple, margined with lilac and white. Brazil, 1877. A handsome free-flowering species, not unlike *L. præstans*. (B. H 1880, 10.)

L. Dominiana (Dominy's).* *fl.* large; sepals and petals light purple, the former with dark reticulations; lip deep blackish-purple; scape three-flowered. Autumn. *l.* solitary, oblong-ligulate. Pseudo-bulbs fusiform. Gardens, 1878. A handsome hybrid.

L. Dormaniana (Dorman's).* *fl.*, sepals and petals olive, marbled out-side with light port-wine colour, which is diffused as a light line inside, excepting at the top of the odd sepal and petal,

Lælia—*continued.*

which have numerous dark spots around the limb; lip lightest purplish-white, with darker veins; middle lobe mauve-purple; scape two to five-flowered. February. *l.* one or two, very cuneate, oblong-ligulate. Pseudo-bulbs terete, thin, slender, about 1ft. high. Brazil, 1880. (G. C. n. s., xiii. 168.)

L. elegans (elegant).* *fl.*, sepals and petals white or rose, varying to carmine; lip deep rich purple; scape erect, three to six or more flowered. It flowers at various seasons, sometimes twice in a year. *l.* usually in twos, spreading, coriaceous, dark green. Pseudo-bulbs long, slender, stem-like. Brazil, 1865. A very beautiful species, succeeding best under pot culture. (B. M. 4700, under name of *Cattleya elegans.*)

L. e. alba (white).* *fl.* white, 6in. in diameter, having the middle lobe of the lip, and a middle line running to its base, rich carmine-magenta. 1884. A grand variety. (I. H. 526.)

L. e. gigantea (gigantic). *fl.* large; sepals and petals lilac or mauve, profusely spotted with rosy-purple; lip intensely rosy-purple; scape many-flowered. Brazil, 1862. A very desirable strong-growing kind. SYN. *L. gigantea.* (W. S. O. 6.)

L. e. Houtteana (Van Houtte's). *fl.*, lip with nearly rectangular blunt side laciniæ; median lacinia having at top a much-dilated, nearly reniform, toothleted blade of richest purple, while the ends of the side laciniæ have a little touch of mauve on their purple.

L. e. lobata (lobed). A curious variety, having petals very narrow, and bearing one obtuse lobe on either side, having also rectangular side laciniæ of the lip. Brazil, 1869.

L. e. Marshalliæ (Mrs. Marshall's). *fl.*, petals purplish, handsomely veined; lip rich deep purple, broad, wavy, and recurved. Brazil, 1872.

L. e. picta (painted). *fl.*, sepals and petals light rose, marked with greyish zones, and small dark purple spots; lip yellow, with the tips of the side lobes and disk purple. 1884.

L. e. prasiata (topaz-like). *fl.*, sepals rose-magenta, whitish in the centre, and greenish towards the base; petals rosy-lilac; lip white where it wraps round the column; disk of the richest magenta.

L. e. Turneri (Turner's).* *fl.* none more than 6in. across; sepals and petals deep rose-pink, slightly veined with a darker hue; lip of a rich magenta, shaded with rose. Brazil, 1863. A beautiful species. SYN. *L. Turneri.* (W. S. O. 12.)

L. flammea (flame-coloured).* *fl.* 3in. to 4in. across; sepals and petals vivid orange-scarlet; lip purple-crimson, beautifully fringed at the margin. March and April. A very handsome hybrid, the result of a cross between *L. cinnabarina* and *L. Pilcheri*, in habit somewhat resembling the first-named. SYN. *L. Veitchii.*

L. flava (yellow). *fl.* very brilliant yellow, about 2in. across; scape 1ft. to 1½ft. high, from three to five-flowered. April. Brazil, 1841. A pretty species, similar to *L. cinnabarina* but rather smaller, and the leaves are shorter and more erect. (B. R. 1842, 62.)

L. furfuracea (scurfy-stalked). *fl.* about 5in. in diameter, rosy-purple or bright lilac, with a darker lip; scape usually two-flowered. Autumn. *l.* usually solitary, light green. Mexico, 1838. A fine species, resembling *L. autumnalis* in habit, but with much broader petals. (B. M. 3810.)

L. gigantea (gigantic). A synonym of *L. elegans gigantea.*

L. grandis (large). *fl.*, sepals and petals of a light nankeen colour; lip white in the throat, edged and veined with lilac and purple. Summer. *l.* usually solitary, rigid, dark green. Stems small at the base, thicker at the upper part. Bahia, 1850. (B. M. 5553.)

L. harpophylla (sickle-leaved).* *fl.*, sepals and petals bright orange-scarlet; lip of the same colour, with a white blotch at the apex; scapes short, erect, five to ten-flowered. February and March. *l.* solitary, lanceolate. Pseudo-bulbs slender, cylindrical, about 1ft. high. Brazil, 1873. (F. M. n. s. 70.)

L. Jongheana (Jonghe's).* *fl.* from 4in. to 5in. across; sepals lanceolate, 2½in. long, of a beautiful bright amethyst-purple tint; petals ovate or oblong, nearly 2in. broad, with slightly wavy margins of the same colour as the sepals; lip having pale purple lateral lobes, yellowish outside, golden-yellow within, having seven lamellæ or plates over its disks; central lobe of a pure white, with a narrow margin of the brightest amethyst-purple; spikes one or two-flowered. *l.* dark green. Brazil, 1872. (B. M. 6038; G. C. 1872, 425.)

L. Lawrenceana (Lawrence's). A garden synonym of *L. crispilabia.*

L. Lindleyana (Lindley's).* *fl.*, sepals and petals white or pale rose colour, 2in. long, lanceolate; lip rosy-lilac, pale creamy-yellow, blotched and streaked with pale purple on the disk; peduncles one or two-flowered. *l.* in twos, thick, narrow, glaucous, 5in. to 7in. long. Pseudo-bulbs erect, slender, 6in. to 9in. high. Brazil, 1865. This plant flowers freely at various parts of the year, and remains from three to six weeks in perfection. (B. M. 5449, under name of *Cattleya Lindleyana.*)

L. majalis (May-flower).* *fl.* of a bright silvery-lilac, from 4in. to 5in. across; lip blotched with crimson-purple, margined with rosy-lilac, centre white; scape one-flowered. Early summer. *l.* solitary. Pseudo-bulbs ovate, almost the size of pigeons eggs. Mexico, 1838. A very beautiful species, known to the Mexican Spaniards as the Flor de Maio, or May Flower. It is somewhat difficult to manage, and should be grown in a cool house, being fully exposed to the sun all the year round, and suspended near the glass. (B. M. 5667; B. R. 1844, 30.) There is a white-flowered variety in cultivation.

L. monophylla (one-leaved).* *fl.* (excepting the purple anther) entirely orange-scarlet, 1½in. in diameter; sepals and petals equal, oblong, acute; lip exceedingly small, adnate to the column; peduncles one-flowered, with two or three greyish speckled sheaths. Stems very slender, one-leaved. Jamaica, 1883. A showy, free-flowering little species. (B. M. 6683.)

L. Mylamiana (Mylam's). A curious hybrid between *Cattleya crispa* and *C. granulosa*, the flowers closely resembling those of the first-named parent; spike about six-flowered. *l.* solitary, leathery, ovate, obtuse, 8in. long. Pseudo-bulbs stout, cylindrical, about 1ft. high. Gardens, 1876. (G. C. n. s., ii. 741.)

L. peduncularis (peduncled). *fl.*, sepals and petals of a beautiful dark rose; lip same colour, with darker spots in the centre. Winter. Mexico, 1841. A very pretty evergreen species, with a compact habit, somewhat resembling *L. acuminata.* (B. R. 1845, 69.)

L. Perrinii (Perrin's).* *fl.*, sepals and petals rosy-purple, tipped with purplish-magenta; lip deep crimson, distinctly three-lobed; scape erect, three to six-flowered. October and November. *l.* solitary, narrow, dark green, 9in. to 12in. long. Pseudo-bulbs stout, purplish, clavate, distinctly furrowed. Brazil, 1831. (B. R. 1828, 2.)

L. P. irrorata (bedewed). *fl.* light rose-colour; lip nearly white, with a pale yellow disk, and a light purple apex. 1881. A fine form.

L. P. nivea (snowy). A very pretty variety, having pure white flowers, with the end of the lip purple. Brazil, 1880. (F. M. 429.)

L. Philbrickiana (Philbrick's).* *fl.* very beautiful; sepals and petals light chestnut-brown, with purple spots; lip anterior; blade transverse, sub-cordate, emarginate, deep rich purple, with a little white triangle in the middle of the base; side laciniæ oblong-triangular, whitish, with light purple borders; disk light purple, with a whitish line; scape two-flowered. *l.* in twos, the larger 3½in. long, 1½in. wide. Pseudo-bulbs dwarf. 1879. A garden hybrid between *L. elegans* and *Cattleya Aclandiæ.*

L. Pilcheri (Pilcher's). *fl.*, sepals and petals light rose, oblong-ligulate; lip rolled round the column, three-lobed, the anterior part very crisp; disk whitish-yellow, with deep purplish veins. Gardens, 1868. A handsome hybrid between *L. Perrinii* and *Cattleya crispa.*

L. præstans (excelling).* *fl.* solitary, or very rarely two together; sepals and petals broad, rich deep rose; lip crimson-purple. April and May. Pseudo-bulbs and leaf rarely exceeding 6in. in height. Brazil, 1859. A very beautiful dwarf-growing species, often flowering twice in a year, and thriving best on a block of wood or cork. It resembles *Cattleya marginata* in growth and size of flowers. (B. M. 5498.)

L. purpurata (purple-stained).* *fl.* very large; sepals and petals pure white; lip very large, sometimes as much as 5in. in length, rich deep purplish-crimson; scape erect, three to seven-flowered. May to July. *l.* solitary, broad, leathery, dark green. Pseudo-bulbs large, stout. Brazil, 1852. This species has been often, and not without reason, styled the grandest orchid in cultivation. It is one of the noblest for exhibition purposes; and grows best in a pot, in coarse fibrous peat, with fresh sphagnum, crocks, and charcoal freely interspersed. The pot must be half full of crocks, and the plants need plenty of water when growing. (G. C. n. s., xx. 533; P. F. G. iii. 962; W. S. O. 40.) Of the several varieties, the undermentioned are most desirable:

L. p. alba (white). *fl.* pure white; lip faintly tinted and veined with pale rose, and stained with yellow at the base. Brazil, 1869.

L. p. Nelisii (Nelis's). *fl.* large; sepals and petals white, tinged with rose on the inside, whilst the sepals only on the outside are of a rich rose-colour; lip large, reddish-crimson. Brazil.

L. p. Williamsii (Williams's).* *fl.* large, over 5in. across; sepals and petals beautiful delicate rose; lip rich crimson, very large; spike three or four-flowered. May and June. *l.* rich dark green. Brazil.

L. superbiens (gorgeous-flowered).* *fl.* from 6in. to 8in. across; sepals and petals rich rose, streaked with red; lip deep crimson, striped with yellow; spike about 5ft. high, bearing from ten to twenty flowers near the apex. Winter. *l.* in twos, thick, leathery, rather light green. Pseudo-bulbs spindle-shaped, long, stout. Guatemala, 1840. (B. M. 4090; W. S. O. 20.)

L. Turneri (Turner's). A synonym of *L. elegans Turneri.*

L. Veitchiana (Veitch's).* *fl.*, sepals delicate lilac; petals of a deeper colour, with pale amethyst-purple spots; anterior half of lip crimson-purple, with a sulphur yellow disk behind, streaked with purple in centre; the whole with a narrow pale lilac border. *l.* dark green, of great substance. A gorgeous hybrid. (G. C. n. s., 1883, Aug. 4.)

L. Veitchii (Veitch's). A synonym of *L. flammea.*

Lælia—*continued.*

L. virens (green). This species is something like *L. cinnabarina*, but has greenish-yellow sepals and petals, and a narrow, three-lobed, white lip. 1879.

L. Wallisii (Wallis's).* *fl.* of a charming rosy-blush colour; lip finely marked with yellow. Rio Negro, 1866. A remarkably beautiful epiphyte, with the aspect of *Cattleya bulbosa.*

L. Wyattiana (Wyatt's). *fl.*, petals white, very acute; lip almost rhomboid; nervings of disk dark purple; side lobes light yellow outside; anterior lobe fine light purple. A lovely hybrid.

L. xanthina (yellow-flowered).* *fl.* of a clear golden-yellow, from 2in. to 3in. across; lip whitish, with orange streaks on the disk; scapes erect, five to seven-flowered. Summer. *l.* solitary or in tubes. Pseudo-bulbs clavate, 9in. to 12in. high. Brazil, 1859. (B. M. 5144.)

LÆLIOPSIS (from *Lælia*, and *opsis*, resemblance; on account of the similarity between the two genera). ORD. *Orchideæ.* A genus of three or four species of stove epiphytal orchids, from the West Indies. *Læliopsis* was founded by Lindley on the plant described below; in his own words, it is "a Cattleya in all respects, except that the flowers are membranous, and the veins of the lip bearded." For culture, *see* **Cattleya.**

L. domingensis (St. Domingo). *fl.* gay lilac, a little veined with yellow in the middle of the lip; lip two-lobed, with its divisions wavy, denticulate, recurved; scape slender, naked, bearing about eight flowers. *l.* oblong, coriaceous, obtuse. Pseudo-bulbs two-leaved. 1851. (L. & P. F. G. iii. 105.)

LÆVIGATE. Having the appearance of being polished, as many seeds.

LAFOENSIA (named after the Duke of Lafoens, 1719-1806, once President of the Lisbon Academy of Science). SYN. *Calyplectus.* ORD. *Lythrarieæ.* A small genus (about six or eight species have been described) of glabrous stove trees or shrubs, natives of Brazil and New Grenada. Flowers large, solitary and axillary, or often in short terminal panicles. Leaves opposite, oblong or obovate, acute or obtuse, entire, shining, glandular at the apex. Only one species has been introduced into this country. For culture, *see* **Lagerstromia.**

L. microphylla (small-leaved). *fl.* reddish-brown, showy, large. *l.* elliptic, leathery, shortly stalked. Brazil, 1847.

LAGASCA. *See* **Lagascea.**

LAGASCEA (named after M. Lagasca, a Spanish botanist and professor at Madrid, who died in 1839). Sometimes spelt *Lagasca.* SYN. *Noccæa.* ORD. *Compositæ.*

Lagascea—*continued.*

A genus comprising about seven species of rather rigid stove shrubs or herbs, natives of Mexico and Central America. Flower-heads doubly compound, solitary, or in leafy, crowded, corymbose panicles; each floret having a slender, tubular, white, yellow, or red corolla. Leaves opposite, or the upper ones alternate, entire or toothed. The species are not particularly valuable for horticultural purposes. For culture, *see* **Dysodia.**

L. latifolia (broad-leaved). *fl.-heads* white, fragrant, terminal; bracts six to eight; florets five-toothed, woolly outside. June. *l.* opposite, sessile, more or less clasping the stem at the base, oblong or elliptical, taper-pointed. *h.* 10ft. to 12ft. Mexico. Shrub. (S. B. F. G. 215, under name of *Nocca latifolia.*)

L. mollis (soft). *fl.-heads* white; involucre five-leaved. August and September. *l.* petiolate, ovate, acuminate, sub-serrate, sometimes quite entire. Cuba. Plant velvety. Annual. (B. M. 1804.)

LAGENARIA (from *lagena*, a flask; in allusion to the usual form of the fruit). Bottle Gourd. ORD. *Cucurbitaceæ.* A monotypic genus, the species being a hardy, musky, pubescent annual. For culture, *see* **Gourds.**

L. vulgaris (common).* *fl.* white, large, monœcious, rarely diœcious, stellate, fascicled. August. *fr.* shaped like a bottle, when ripe of a pale yellow colour, sometimes growing 6ft. in length, with a roundish bottom and a neck; probably poisonous. *l.* cordate, nearly entire, biglandular at the base, pilose. Asia and tropical Africa, 1597 (now cultivated in most tropical countries). See Fig. 371. There are numerous varieties, differing principally in the shape of the fruit.

FIG. 371. FLOWERING BRANCH (1, Female Flower; 2, Male Flower) AND FRUIT OF LAGENARIA VULGARIS.

LAGENOPHORA (from *lagenos*, a flask, and *pherein*, to bear; referring to the flask-like involucres). SYNS. *Ixauchenus* and *Microcalia.* ORD. *Compositæ.* A genus comprising about a dozen species of small, Daisy-like, greenhouse herbaceous plants, inhabiting New Zealand and Australia. They are distinguished from *Bellis* in the achenes being narrowed into a beak at the top. Flower-heads small, solitary, on slender scapes; ray-florets white or pale blue, numerous, spreading; disk-florets yellow, tubular. Leaves alternate, lanceolate, entire. Lagenophoras thrive best in a light soil. Propagation may be effected by divisions, in spring. The species are seldom seen under cultivation.

L. Billardieri (Billardière's). *fl.-heads*, involucre ½in. in diameter; ray-florets blue, ligulate, exceeding the involucre; scapes slender, simple, 2in. to nearly 12in. long. Summer. *l.* from obovate to cuneate-oblong, obtuse, irregularly toothed, or shortly lobed,

Lagenophora—*continued.*

narrowed into a petiole, usually all under 2in., rarely above 3in., long. Australia.

L. Forsteri (Forster's). *fl.-heads* yellow and purple, small; scape slender, 2in. to 6in. long. *l.* ½in. to 1in. long, obovate or orbicular-oblong, obtuse, crenate toothed or lobed towards the base. New Zealand, 1837. A small, slender, Daisy-like plant.

LAGERSTRÖMIA (named after Magnus Lagerström, of Gottenberg, 1696-1759, a friend of Linnæus). ORD. *Lythrarieæ.* A genus containing about fourteen species of very handsome stove or greenhouse trees or shrubs, natives of tropical and sub-tropical Eastern Asia. Flowers on axillary peduncles, generally constituting panicles or racemes at the tops of the branches. Leaves opposite, entire. Only one or two species are in cultivation; these succeed in a compost of equal parts peat and loam. Throughout the winter months, the only attention needed consists in giving just sufficient water to prevent the soil getting dust-dry. As the spring advances, both the quantity of water and the amount of heat should be increased. Propagated, in spring, by cuttings of small, firm, side shoots, placed in bottom heat.

L. Flos-reginæ (Queen's flower).* *fl.* of a beautiful rose-colour in the morning, growing deeper through the day, until they become purple in the evening, large, from 2in. to 3in. in diameter; petals orbicular, undulated, on short claws; panicle terminal. *l.* oblong, glabrous, dark green. *h.* 50ft. to 60ft. Malay to China, 1792. Stove. SYN. *L. Reginæ.* (B. F. S. 29.)

L. indica (Indian).* *fl.* bright pink, large, very handsome; petals curled, on long claws; panicle many-flowered, terminal. Summer. *l.* roundish-ovate, acute, glabrous. Branchlets acutely tetragonal, nearly four-winged. *h.* 6ft. to 10ft. China, 1816. Stove or greenhouse. (B. M. 405.)

L. i. alba (white). *fl.* pure white, in which particular alone this variety differs from the type, and to which it forms a very pleasing contrast. China.

L. Reginæ (Queen's). A synonym of *L. Flos-reginæ.*

LAGETTA (native name of the genus). Lace Bark. ORD. *Thymelaceæ.* A genus of two species of elegantly-reticulated trees, native of the East Indies. Flowers few, in loose terminal spikes or racemes, sessile, or shortly pedicellate. Leaves alternate, oblong or broad. *L. lintearia*, the species in cultivation, is a stove evergreen tree, the inner bark of which furnishes the beautiful Lace Bark of commerce. It thrives in a compost of peat and fibry loam. Propagated, in spring, by cuttings of half-ripened shoots placed in sand, under a glass, in bottom heat.

L. lintearia (linen). *fl.* white, with a tubular coloured perianth, a distended tube, and contracted throat. *l.* ovate, acute. *h.* 6ft. Jamaica, 1793. (B. M. 4502.)

LAGUNÆA. Now included under **Hibiscus** (which *see*).

LAGUNARIA (a name given on account of its similarity to *Lagunæa*, a genus now included under *Hibiscus*, and which is so called in honour of Andres de Laguna, a Spanish botanist, 1499-1560). ORD. *Malvaceæ.* A small genus (two species) of greenhouse evergreen trees, one of which is from Norfolk Island, and the other from Eastern Australia. Flowers large, rising singly from the axils of the leaves. Leaves entire, lanceolate. The under-mentioned is probably the only species in cultivation. It thrives best in a compost of peat and loam. Propagated by cuttings of half-ripened shoots, placed under glass, in a gentle heat, during May.

L. cuneiformis (wedge-shape-leaved). A synonym of *Fugosia cuneiformis.*

L. Patersonii (Paterson's). *fl.* pale red, or nearly white, large, solitary, axillary. Summer. *l.* lanceolate-oblong, quite entire, covered with whitish scales beneath. *h.* 20ft. Norfolk Island, 1792. (B. M. 769, under name of *Lagunæa Patersonia.*)

LAGURUS (from *lagos*, a hare, and *oura*, a tail). Hare's-tail Grass. ORD. *Gramineæ.* A monotypic genus, distinguished by the inflorescence being in round spike-like panicles, and the scarious glumes ending in a long fringed bristle The species is one of the handsomest

Lagurus—*continued.*

of British grasses. It is a hardy annual, and thrives best when sown in pots during August and September, wintered in a cold frame or greenhouse, and planted out in the open the following spring.

FIG. 372. LAGURUS OVATUS.

L. ovatus (ovate).* *fl.*, spike ovate, many-flowered, woolly. June to September. *l.* lanceolate, acute, ribbed, downy on both sides; sheaths inflated, ribbed, very downy. Culms about 1ft high, erect, round. Mediterranean region, West Coast of Europe, Channel Islands. See Fig. 372. (Sy. En. B. 1712.)

LALAGE. Now included under *Bossiæa.*

LALLEMANTIA (named after J. E. Lallemant, of the Botanic Garden at St. Petersburg). ORD. *Labiatæ.* This genus contains about four species of annual or biennial, glabrous or canescent herbs, natives of Asia Minor, &c. Flowers blue, small; whorls axillary, commonly six-flowered; calyx erect. Leaves, lower ones on long petioles, toothed; superior and floral ones narrower, and more sessile and entire. The only species yet introduced is the one here described. For culture, *see* **Dracocephalum.**

L. canescens (hoary). *fl.* blue, whorled; bracts oblong, ciliated; calyx striated, pubescent; tube of corolla longer than calyx. July and August. *l.*, lower ones narrow, on long petioles; upper and floral *ones sessile, shortly narrow at the base, all obtuse.* *h.* 1½ft. Orient, 1711. Hardy biennial. SYN. *Dracocephalum canescens.* (S. B. F. G. 38.)

LAMARCKIA (named after J. B. Lamarck, 1744-1829, the great French naturalist). SYN. *Chrysurus.* ORD. *Gramineæ.* A monotypic genus. The species is a pretty, many-stemmed, low, annual grass, generally included by seedsmen in collections of ornamental grasses. It thrives when sown in spring, in the open border, but attains a larger size if treated as recommended for **Lagurus** (which *see*).

L. aurea (golden).* *fl.*, inflorescence in simple crowded panicles; spikelets stalked, two-flowered, one fertile and the other sterile, South Europe and North Africa.

LAMBERTIA (named after A. B. Lambert, 1779-1825, a distinguished patron of botany). ORD. *Proteaceæ.* A genus containing eight species of greenhouse evergreen shrubs, endemic in extra-tropical Australia. Flowers red or yellow, usually long, solitary or seven together, sessile within an involucre of imbricate coloured bracts. Leaves mostly in whorls of three, rarely of four, or sometimes scattered at the base of luxuriant shoots, entire, or with spinescent teeth. Lambertias thrive in a compost of sandy peat and fibry loam. Ample drainage must be given. Propagated by cuttings of young and rather firm shoots; or by seeds, sown in slight heat.

L. formosa (beautiful).* *fl.*, involucres terminal, usually solitary, seven-flowered; inner bracts narrow, silky-pubescent outside;

Lambertia—*continued.*

outer ones short and ovate. June to August. *l.* linear or slightly linear-cuneate; margins recurved, contracted into a very short petiole, rigid, shining above, pale or almost ferruginous beneath. 1788. A tall shrub. (A. B. R. 69; B. R. 528; L. B. C. 80.)

LAMBERT'S FILBERT. *See* **Corylus tubulosa.**

LAMB'S LETTUCE. *See* **Corn Salad.**

LAMINA. Generally applied to the blade of a leaf.

LAMIUM (the old name used by Pliny, probably from *laimos*, a throat, on account of the shape of the corolla). Dead Nettle. Including *Galeobdolon*. ORD. *Labiatæ*. This genus comprises about forty species of annual or perennial hairy herbs, decumbent at the base, natives of Europe, North Africa, and extra-tropical Asia, and distinguished either by the long arched upper lip, or by the smallness of the lateral lobes of the lower lip, of the corolla. Leaves always stalked, ovate or orbicular, and toothed. The species are of no great horticultural value, and perhaps the only ones worth mentioning here are the following:

L. Galeobdolon (Galeobdolon). *fl.* yellow, large, in six to ten-flowered whorls. May and June. *l.* ovate, acuminate, doubly crenated or serrated. Rootstock short, stoloniferous. Europe (Britain), West Siberia. Perennial. (Sy. En. B. 1085.) There is a pretty garden variety with golden-bronzy leaves, useful for rockwork or rustic borders.

L. maculatum (spotted).* *fl.* usually purple, large; corolla throat suddenly dilated. June to September. *l.* cordate, crenate or serrate, wrinkled, with a medium white stripe. A pretty dwarf-growing, free-flowering, border plant. Europe, North Africa, North and West Asia. Naturalised in some parts of Britain. Perennial. (Sy. En. B. 1087.) A form of this (*aureum*), with golden-coloured foliage, is useful as a rock or border plant, and also for spring bedding.

LAMOUROUXIA (named after J. V. F. Lamouroux, 1779-1825, a naturalist and professor at Caen). ORD. *Scrophularineæ*. A genus comprising eighteen species of erect, decumbent, or sub-scandent, greenhouse perennial (or rarely annual) herbs, natives of Mexico, Central, and the mountains of South, America. Flowers scarlet or rosy, showy, axillary, or in terminal spikes or racemes; corolla with a short tube, a long, ventricosely compressed throat, and a bilabiate limb. Leaves opposite, toothed or rarely entire, or dissected. It is doubtful if any of the species are now in cultivation; and, as they are probably all more or less root parasites, it is hardly likely they would remain long in gardens after being introduced.

LAMPROCOCCUS. This genus is now included, by Bentham and Hooker, under *Æchmea*.

LANARIA (from *lana*, wool; perianth velvety on the outside). SYNS. *Argolasia, Augea*. ORD. *Hæmodoraceæ*. A monotypic genus. The species is a very pretty little greenhouse herbaceous perennial, of easy culture in a compost of sandy loam and peat. It should be allowed an abundance of water. Propagated by divisions of the root.

L. plumosa (feathery). *fl.* white, woolly; perianth six-parted, spreading; scape angular, corymbose. May. *l.* few, linear, keeled, smooth. *h.* 1½ft. Cape of Good Hope, 1787.

FIG. 373. LANCEOLATE LEAF, WITH SERRATED MARGINS.

LANCEOLATE. Lance or spear-shaped; narrowly elliptical, tapering to each end. A Lanceolate leaf, with serrated margins, is shown at Fig. 373.

LAND CRESS. *See* **Cress, American** or **Land.**

LANDOLPHIA (named after M. Landolphe, who commanded the West African expedition, to which P. de Beauvois was attached as botanist). ORD. *Apocynaceæ*. A genus comprising about sixteen species of stove scandent shrubs, natives of tropical and Southern sub-tropical Africa and Madagascar. Flowers often rather large; corolla white or yellowish, salver-shaped, with narrow contorted lobes; cymes terminal, sometimes densely tomentose, sometimes loosely thyrsoid-paniculate. Leaves opposite, penniveined, and reticulated. From the species of this genus caoutchouc is largely obtained. *L. owariensis* thrives in a well-drained fibry loam, and cuttings root readily in bottom heat. Several other species besides *L. owariensis* have been introduced to Kew, and distributed to the various British Colonies.

L. owariensis (Owara). *fl.* ½in. long; calyx lobes ovate-rotundate. *fr.* about the size of an orange, with a woody reddish-brown shell, and an agreeable, sweetish acid pulp. *l.* 5in. long, 1¾in. broad, membranaceous. Stems 4in. to 6in. in diameter near the ground.

LANDSCAPE GARDENING. Effective Landscape Gardening is an art which is only acquired by considerable study, taste, and judgment, on the part of persons engaged in its execution. The art has reference chiefly to the laying out of grounds, and the arrangement and planting of trees and shrubs in such a manner as to eventually produce the most pleasing effect, so far as circumstances in individual cases admit. Where natural Landscape does not, to a certain extent, exist, the work of wholly creating it becomes an extensive undertaking, and involves considerably more expense than where an arrangement and improvement, by additional planting, &c., are the only requirements. Landscape gardeners, by profession, are not very numerous, their services being in request principally for laying out new estates; and, as this presents endless difficulties to proprietors, and entails such an enormous amount of work and expense, it is not frequently undertaken. The chances of improvement in Landscape are, however, continually presented, and admit of being executed, by experienced hands, a portion at a time, without materially interfering with the effect of the whole until the work is completed. Definite ideas are absolutely necessary, and no attempt should be made at laying out or improving grounds without the fullest consideration being first given, and the results calculated to prove tolerably certain. A few of the main features may be here referred to, but their application must not be taken as always applicable, so much depending on individual requirements, locality, natural disposition of land, the beauty of existing scenery, and many other points which have to be kept in view. The selection of trees and shrubs for permanent positions should be restricted to such as are known to be perfectly hardy, and adapted to the soil of the locality. Doubtful ones may be tried for giving a variety, but they should be kept in positions where provision can be made for substituting something else in the event of failure. Tall-growing trees must be kept in the background, in the case of an extensive piece of undulating scenery, dwarfer specimens and irregular belts of shrubs being introduced in the front. A large space, and an open expanse of lawn or ordinary grass, is best suited for producing a Landscape effect, the eye passing from the foreground amongst and over trees and shrubs of a moderate height, either isolated or grouped, to an irregular background of various trees behind. The work of devastation amongst trees, when alterations are taking place, requires most careful studying before being carried out, or distinct and fine specimens of historic interest may be ruthlessly destroyed, and their place taken by something far removed, in reality, from the aim of improvement in view. Spring and summer are the best seasons for noting where improvements can be made, as the different forms of foliage and the way they

Landscape Gardening—*continued.*

contrast, the preponderance of one sort of tree and the absence of others, the proportion of deciduous and evergreen subjects, any obstructions that may be seen to hide fine specimen trees, avenues, or other permanent objects it is desired should be fully exhibited, may each and all be more readily seen when the leaves are fully expanded. Any defects noticed in this way may be committed to memory or paper, with a view to effecting a remedy, at the proper season, by cutting away, or by replenishing in places where deficiencies occur. Planting should further be conducted so as to prove effective, more or less, at all seasons; the introduction of trees for spring flowering receiving due attention, also others for autumn foliage, and a distribution of conifers or evergreen subjects, so as to avoid a patchy appearance in winter, resulting from the arrangement of the deciduous and evergreen kinds in too much of an alternate order. Spring-flowering trees and shrubs present a much finer appearance in Landscape when there is a good background; and, as few of them exceed a height of 20ft., such positions may generally be secured. The following, named in their usual order of flowering, are amongst the most noteworthy and conspicuous: Almonds, *Prunus divaricata*, *P. Myrobalana*, Amelanchiers, *Pyrus baccata*, *P. floribunda*, *P. spectabilis*, *Cerasus serrulata*, *Magnolia conspicua*, and its variety *Soulangeana*, Berberries, Lilacs, Laburnums, Hawthorns, Rhododendrons, and hardy Azaleas. Trees having divided leaves should be placed in prominent positions, as they are specially ornamental in summer; examples are *Ailantus*, Black Walnut, and *Robinia*. Those with white, yellow, or dark-coloured foliage are very telling from a distance, when judiciously placed, notably White Poplar, Golden Oak, and Purple Beech, amongst others. Of trees specially noteworthy on account of the colours assumed by their leaves in autumn, the scarlet Oak and Liquidambar may be mentioned. These are very fine in contrast with others having yellow or brown foliage, such as the Elm, Beech, Plane, Lime, and Hornbeam. The Lime and Horse Chestnut are, perhaps, two of the best trees for isolated clumps, their natural symmetrical habit causing the lower branches eventually to touch the ground, if protected from cattle, and left unpruned. Planting for immediate effect can rarely be practised to any great extent, on account of labour and expense; consequently, the future appearance and results of Landscape Gardening depend on the judgment exercised in the first instance, by disposing of the space and material at command to the best advantage. In a comparatively small space, the grouping of trees and shrubs, and the provision of a piece of open lawn in front, is specially recommended, so far as circumstances admit, in preference to a promiscuous arrangement of the former in all directions, and the cutting-up of the grass in consequence.

An important feature in the production of Landscape effect, wherever it can be obtained, is a broad stream or lake of ornamental water. In many places, where there are an extensive park and pleasure grounds, a running stream is already present, or, by diverting its course, such a valuable addition to the surroundings may be obtained from a neighbouring source. The course of the stream should be rendered irregular in width and outline, so as to present as natural an appearance as possible. An island, or a piece of land projecting from the edge into the water, judiciously planted with trees, near the points where the stream appears and disappears, will greatly heighten the effect produced. Water Lilies, and other aquatic plants, may be introduced to the shallow parts near the margin; and Alders, Willows, and Birch are specially adapted for planting on islands, or anywhere by the side of water.

The foregoing must only be taken as general remarks on gardening in connection with Landscape: peculiarities

Landscape Gardening—*continued.*

which abound in almost every case can only be dealt with individually. *See also* **Garden.**

LANIPILA. A synonym of **Lasiospermum** (which *see*).

LANKESTERIA (named after Dr. E. Lankester, a distinguished British botanist). ORD. *Acanthaceæ.* A small genus (three species have been described) of tall stove evergreen herbs. Flowers yellow or red, sessile in the axils of the bracts, solitary or fasciculate, densely spicate; bracts ovate or lanceolate, often imbricate. Leaves entire. For culture, *see* **Eranthemum.**

L. Barteri (Barter's). *fl.* primrose, orange-eyed, salver-shaped, in terminal, simple or compound spikes. *l.* ovate-oblong, acuminate. West Africa. Stove. (B. M. 5533.)

L. hispida (hispid). *fl.* yellow; spikes short, axillary, and terminal; calyx hairy. September to November. *l.* obovate, acuminated, undulated, hairy. Branches villous. *h.* 1ft. Sierra Leone. SYNS. *L. longiflora*, *L. parviflora*. (B. R. 1846, 12, under name of *Eranthemum hispidum.*)

L. longiflora (long-flowered). A synonym of *L. hispida.*

L. parviflora (small-flowered). A synonym of *L. hispida.*

LANSBERGIA. A synonym of **Trimezia** (which *see*).

LANTANA (an old Italian name for the Wayfaring-tree). ORD. *Verbenaceæ.* A rather large genus (about fifty species have been enumerated) of stove evergreen shrubs or herbs, for the most part natives of the warmer regions of the New World, a few African and Asiatic. Flowers red, golden, white, or various-coloured, in pedunculate axillary heads; corolla tube slender, with a spreading five-lobed limb. Leaves opposite, dentate, often rugose. The large number of hybrid forms (one is re-

FIG. 374. HYBRID LANTANA, showing Inflorescence and detached Flower.

presented in Fig. 374) now in cultivation are extensively employed for greenhouse decoration and for bedding-out purposes. They are of comparatively easy culture, and produce an abundance of flowers for six or seven months out of the year, many of which are very pretty, but not by any means agreeably scented. Lantanas thrive best in a compost of two parts of good loam, and one part of leaf mould or decayed manure. They require potting moderately firm. Propagated, in August or September, by cuttings, which should be placed in small pots, and wintered in an ordinary greenhouse. In March, they should be shifted into 3in. pots, and, when the side shoots are large enough, stopped back, the points being struck in a gentle bottom heat. If it is desired to have large plants, those stopped back should be repotted into 6in. pots. Plenty of water will be necessary while they are growing freely. Young plants grow and flower well outside in summer; old ones, cut back and repotted, are best suited for culture

Lantana—*continued.*

inside, their growth being shorter-jointed and more floriferous. All the species mentioned below are subshrubs or shrubs.

L. aculeata (prickly). A synonym of *L. Camara.*

L. annua (annual). A synonym of *L. trifolia.*

L. Camara (Camara). *fl.* red, orange, varying in colour in different plants; spikes hemispherical. June. *fr.* a roundish berry, black when ripe. *l.* opposite, ovate or oblong, pointed, as long as the peduncles, serrate. Stem prickly. *h.* 6ft. to 10ft. Jamaica, 1692. (B. M. 96, under name of *L. aculeata.*)

L. crocea (copper-coloured). *fl.* bright red, yellow in the centre of the clusters, which are axillary, on long peduncles. June. *l.* opposite, ovate, acute, somewhat recurved wrinked and rough. *h.* 3ft. Jamaica, 1818. (P. M. B. x. 53.)

L. nivea (snowy). *fl.* white, in hemispherical spikes. July to October. *l.* opposite, ovate-lanceolate, acuminate, decurrent at base, having a powerful odour like that of Ground Ivy, but stronger. Stem prickly. East Indies. (B. M. 1946.)

L. n. mutabilis (changeable). *fl.* at first yellow, gradually becoming rose-colour, borne on prickly peduncles. May and June. (B. M. 3110.)

L. Selloviana (Sellow's). *fl.* bright purplish-red, paler on the outside, arranged in flattish heads. December and January. *l.* opposite, ovate, pointed, crenate-serrated, pubescent on both sides. Stem pubescent, procumbent. Monte Video, 1822. (B. M. 2981.)

L. trifolia (three-leaved). *fl.* reddish or purplish; heads ovoid-globose, at length oblong. August. *l.* elliptical or elliptical-oblong, pointed, cuneate-tapering at base, serrate, often whorled. *h.* 3ft. West Indies, 1733. Shrub. (B. M. 1449.) The plant figured in B. M. 1022 is a young one, and it was then presumed to be annual; hence the name *annua*, there given.

The following is a selection of the best varieties:

BOUQUET BLANC, straw-colour, changing to white, very dwarf habit; DISTINCTION, rich orange-scarlet, good; DON CALMET, pink, changing to yellow, a floriferous and good variety; ELDORADO, white, with lemon eye, dwarf habit; FABIOLA, rose, yellow, and orange, free habit; FAVORITA, yellow, changing to dark brown, shaded purple, good habit; GLOBE D'OR, deep yellow, dwarf; HEROINE, yellow, changing to chocolate, large flowers, good habit; JANUS, deep yellow, changing to rosy-purple, compact habit; LA NEIGE, pure white, very free and dwarf; LOUIS BENOIT, deep orange-scarlet, dwarf and very floriferous, one of the best; MAGENTA KING, purplish-scarlet, nearly self-coloured; METEOR, pale yellow, changing to rose; MULTIFLORA, rich yellow self, medium truss, very free; NE PLUS ULTRA, rose, pink, and lavender, good; RAYON DE SOLEIL, deep yellow, changing to rosy-violet, large flowers; VER LUISANT, brilliant yellow, large truss, dwarf; VICTOIRE, pure white, rich lemon eye.

LAPAGERIA (named after Josephine Lapagerie, afterwards Empress of the French, who was an ardent botanist). SYNS. *Capia, Phænocodon.* ORD. *Liliaceæ.* A monotypic genus, the species being a tall, hardy or nearly hardy, climbing shrub. Lapagerias rank amongst the most beautiful greenhouse climbing plants in existence, and are suited equally well for houses of large or small dimensions. They are specially adapted for training over corridors, as here the pendent, waxy flowers are seen to the best advantage. Plants of a good form of the typical species, and others of the chastely pure white variety, have a fine effect, when in flower, if planted alternately, and trained to a roof. Lapagerias succeed on walls and trellises outside, in the warmest parts of the country, and are not injured by a little frost. They may be propagated from seeds, sown, soon after being gathered, in a sandy-peat soil, and kept in a moderate heat. By crossing white and red flowers for raising seed, varieties with flowers intermediate in colour are generally obtained. The most usual mode of propagation is by layers; strong, firm shoots, when layered and covered with soil, producing fine young plants. Where Lapagerias are raised in quantity, beds of suitable soil are prepared, the parent plants placed in them, and the shoots pegged down. A moist medium temperature is maintained; and when young plants are sufficiently established, they are detached and potted.

FIG. 375. LAPAGERIA ROSEA.

Cultivation. Lapagerias may be grown in pots, but they succeed much better when planted out in a prepared bed, and their growths trained on a wire trellis. The appearance of a plant in flower, when trained on a wall, is shown in Fig. 375. Important requisites for success in their culture are: thorough drainage, and a start with strong, healthy plants. Weak plants are seldom satisfactory, nor do they become so, in many instances, by

Lapageria—*continued.*

planting out. The soil best suited is three parts good fibry peat to one of loam, and plenty of sharp sand or charcoal should be intermixed. The roots may be inclosed, where space is limited, by slates or a narrow wall, allowing a space of about a square yard inside; otherwise, the crowns spread by their underground stems, and throw up new shoots a considerable distance from where they were originally intended to do so. Young shoots are a special prey for slugs; consequently, the latter should be rigidly excluded, by a band of cotton wool, broken glass, or some other impassable barrier, until the growths are solidified. A cool temperature, and shade in summer, are best suited for the Lapageria, such as a position in a greenhouse or structure devoted to cool flowering subjects. Plenty of water may be given while the plants are growing, and frequent heavy syringings, until the flowers begin opening, are advantageous. Healthy plants, thus treated, flower profusely from the latter part of summer until very late in the autumn.

Insects. The young shoots of the Lapageria invariably become infested with Green Fly in spring. Fumigating lightly, on two successive evenings, is the best remedy, and one that should be immediately applied, or the growths will be crippled. Mealy Bug, Scale, and Thrips, also infest the plants, and must be kept down by syringing and sponging the firm leaves and stems with a rather strong solution of soft soap.

L. rosea (rosy).* *fl.* rich rosy-crimson, large, pendulous, in the axils of the upper leaves, or at the apices of the branches, solitary or few, produced in great abundance, and remaining in full beauty for several months. *l.* alternate, lanceolate-ovate or sub-cordate, acuminate, coriaceous, three to five-nerved, and reticulately veined. Chili, 1847. See Fig. 375. (B. M. 4447.) The flowers of this beautiful species vary, in size and substance, on different plants, under cultivation, some being very large and superior in every way to others. Obtaining a good "variety" is an important matter.

L. r. alba (white).* A very beautiful form, with spotless white flowers, thus constituting an admirable contrast to the typical species. Chili, 1854. (B. M. 4892.)

L. r. superba (superb).* Described as a magnificent variety, producing fine large flowers of an exceedingly rich and brilliant crimson colour.

LAPEYROUSIA (named in honour of J. F. G. de la Peyrouse, 1741-1788, the French circumnavigator). SYNS. *Meristostigma*, *Ovieda*, and *Peyrousia*. ORD. *Irideæ*. A genus comprising about eighteen species of half-hardy bulbous plants, natives of Southern and tropical Asia, allied to *Anomatheca*, but with the spreading lobes more equal, and stigmas more deeply cleft. Flowers on terminal elongated spikes. Leaves sheathing. For culture, &c., *see* **Anomatheca** (which genus is included, by Bentham and Hooker, under *Lapeyrousia*).

L. anceps (two-edged). *fl.*, perianth tube bluish-purple, long, slender; limb hypocrateriform; segments spathulately lanceolate. September. *l.* broadly ensiform, many-nerved, short and blunt; edges more or less curled, and sometimes toothed, rather glaucous, light green; upper ones sheathing the stem. Stem 9in. high, branched, flat. Cape of Good Hope, 1824. (S. B. F. G. 143.)

L. corymbosa (corymbose). *fl.* bright blue, with a white and dark blue angled band encircling the central portion of the perianth; the angles are acute, and extend about half the length of the segments; corymbs several-flowered, clustered, on loose, slender stems. May. *l.* narrow, tapering. *h.* 6in. to 12in. Cape of Good Hope, 1791. (B. M. 595.)

L. fissifolia (cleft-leaved). *fl.* pink or rose, with very narrow tubes 2in. or more in length, fragrant, produced from the axils of the leaves, chiefly near the apex of the stem. August. *l.* tapering, becoming small towards the upper part of the stem. *h.* 6in. Cape of Good Hope, 1809. A very rare species. (B. M. 1246.)

LAPLACEA (named in honour of P. S. de la Place, 1749-1827, the celebrated French mathematician). SYNS. *Hæmocharis*, *Lindleya* (of Nees), and *Wikströmia*. ORD. *Ternströmiaceæ*. This genus comprises about twelve species of stove trees or shrubs, three of which are natives of the Indian Archipelago, and the rest tropical American. Flowers often sub-sessile, in the axils of the upper leaves. Leaves less coriaceous than in *Gordonia*. For cultivation, *see* **Ochna**.

Laplacea—*continued.*

L. semiserrata (half-serrate). *fl.* white; calyx and corolla silky on the outside. September. *l.* lanceolate, dentately serrated, glabrous. *h.* 30ft. Brazil, 1842. (B. M. 4129.)

LAPORTEA (named by Gaudichaud after his friend M. Laporte). ORD. *Urticaceæ*. A genus comprising twenty-five species of stove perennial herbs, shrubs, or trees, widely distributed throughout the warmer regions of the Old World, a few being natives of extra-tropical North America or Mexico; the genus is quite absent from South America. Flowers monœcious or diœcious; panicles axillary, solitary, cymose-dichotomous or rarely reduced to simple racemes. Leaves alternate, often large, dentate, rarely entire, penniveined, rarely three-nerved. Laporteas thrive in a compost of rich loam and fibrous peat or leaf mould. Propagated by seeds; or by cuttings, placed in sand, under a bell glass, in heat. Great care should be exercised in handling these plants, as they possess stinging hairs, which cause acute pain, and the effects last for a long period.

L. crenulata (crenulated). *fl.* diœcious. *l.* elliptic or ovate, acuminate, cordate at base. Branches unarmed. India. Tree. (B. F. S. 306.)

L. gigas (giant). *fl.* green. *l.* large, broadly-ovate or rotundate, often abruptly attenuate or shortly acuminate at base, cordate, sub-entire, or unequally sinuate-crenate or serrulate. *h.* 80ft. India to Australia, 1874. Tree.

L. Schomburghii versicolor (Schomburgh's various coloured). *l.* deep green, irregularly mottled with greyish green, and variegated with patches of creamy-white, large, alternate, having at their base deciduous herbaceous stipules; petioles fleshy, 1½in. to 2in. long, deep wine-purple, which colour is continued along the midrib and principal side veins. Sometimes, the creamy-white marking covers the whole of the leaf surface on one side the midvein. Polynesia, 1875. A handsome ornamental-leaved plant.

LAPPULA. *See* **Echinospermum.**

LARCH. *See* **Larix.**

LARDIZABALA (named after M. Lardizalay of Uribe, a Spanish naturalist). ORD. *Berberideæ*. A small genus (two species have been described) of hardy, or nearly hardy, climbing shrubs. Flowers purple or livid, diœcious; peduncles axillary. Leaves two or three-ternate; leaflets entire or sinuate-dentate, feather-nerved and sub-triplinerved. The only species as yet introduced is a very handsome tall-growing climber. It thrives in a well-drained compost of sandy loam and peat. Propagated by cuttings, made of half-ripened shoots, and inserted in sandy soil, under a glass.

L. biternata (biternate). *fl.* purple, in drooping racemes, axillary. December. *l.* dark green, glossy, twice-ternate; leaflets oblong, acute, unequal at the base. Chili, 1848. This desirable plant reaches perfection only when growing in a conservatory. (B. M. 4501.)

LARDIZABALEÆ. A tribe of *Berberideæ*.

LARGE WHITE CABBAGE BUTTERFLY. *See* **Cabbage Caterpillars.**

LARIX (an ancient name for the Larch, used by Dioscorides). Larch. ORD. *Coniferæ*. A genus comprising about eight species of ornamental, hardy, deciduous trees (formerly included under *Pinus*), natives of the temperate regions of the Northern hemisphere. Flowers monœcious, or male and female on the same plant; male catkins small, without footstalks, egg-shaped; female ones erect, solitary, ovate, much longer than the males. Leaves linear, obtuse, soft, without footstalks, produced singly or in bundles, deciduous. Cones small, oval-obtuse or somewhat cylindrical, consisting of but few scales. Some of the species are extensively grown for their timber, which is valuable for many purposes. For general culture, *see* **Pinus.**

L. americana (American).* Black Larch. *l.* shorter and more slender than in the common Larch. Branches horizontal. *cones* ovoid, ½in. to ¾in. long, of few rounded scales. *h.* 70ft. to 90ft. North America (in swamps). A slender tree, with heavy, close-grained wood. SYNS. *Pinus microcarpa*, *P. pendula*.

L. a. brevifolia (short-leaved). A synonym of *L. occidentalis*.

L. dahurica (Dahurian). *l.* single, or in bundles of many together round a central bud, soft, bright green, narrow-linear, blunt-

Larix—*continued.*

pointed, spreading, recurved, deciduous. Branches distorted and pendulous. *cones* oblong or egg-shaped, ½in. to ¾in. long. Dahuria, &c. A small tree, dwarfing down by climate to a stunted bush; it is, in the Arctic regions of Siberia, one of the last vestiges of arborescent vegetation.

L. decidua (deciduous). A synonym of *L. europæa.*

L. europæa (European).* Common Larch. *l.* linear, soft, blunt, or rounded at the points, spreading, slightly recurved, bright green. Branches spreading, horizontal. *cones* longish-oval, erect, brown, 1in. long, ripening late in the autumn, remaining a long time on the trees; scales persistent, roundish. *h.* 80ft. to 100ft. Europe (at high altitudes), 1629. A fine, quick-growing tree. This splendid species requires an elevated open situation, in which moisture does not linger, and prefers an alluvial sandy loam. The regularity of outline during every stage of growth, which makes it a beautiful object for decoration, has caused it to be frequently employed in situations unfavourable to its natural development, such as close to dwelling or other houses, where there is not sufficient space for it to expand and perfect its full beauty when it assumes a conical form. The Larch, being deciduous, presents a bare appearance after its leaves have fallen; and is, therefore, generally mixed with other trees of an evergreen character. Its leaves are often spoilt by the early frosts, which do plantations of Larch much injury on southern exposures, though no amount of cold appears to affect the tree during winter. It is frequently grown in conjunction with Scotch Pine, though the Oak, perhaps, is its most natural associate, as the latter derives nourishment from a great depth of soil, and is late in being furnished with leaves. The Larch appears to flourish best on steep declivities, or slopes of ravines, where the soil is moist, but where the water runs both off the surface and beneath the ground rapidly. In stagnant moisture, it becomes dwarfed in its growth. SYNS. *L. decidua, L. pyramidalis, L. vulgaris.* Two varieties worth growing are: *glauca*, having decidedly glaucous foliage; and *pendula*, with slender, drooping branches.

L. Griffithii (Griffith's). Sikkim Larch. *l.* longer than those of the common Larch, slightly glaucous when young, spreading, and of a beautiful light green, becoming red in autumn. *cones* large, oblong-cylindrical, without footstalks, blunt-pointed, erect, 2½in. long, 1in. broad, slightly incurved, reddish-purple when young, and abounding in white resin. *h.* 30ft. to 40ft. Bhotan, Sikkim, and Eastern Nepaul. An inelegant, awkwardly-branched tree. Its timber is small, but splits well, and is employed for flooring. (C. H. P. 21.)

L. japonica (Japanese). A synonym of *L. leptolepis.*

L. Ledebourii (Ledebour's). Russian or Archangel Larch. *l.* soft, linear, broad, and rather flat on strong young plants, but on older ones rather four-sided, obtuse, darker green, and with much longer and broader foliage than the common Larch. Branches robust, but not numerous, and pendent. *cones* very small, erect, slender, and rather loose. *h.* 80ft. to 100ft. Siberia. A luxuriant tree.

L. leptolepis (slender-scaled).* *l.* linear, blunt-pointed, soft, spreading at the points, slightly recurved, of a beautiful light green, ¾in. to 1¼in. long. Branches nearly cylindrical, smooth, very spreading, horizontal, and in regular whorls; branchlets slender, mostly drooping. *cones* ovate, rounded, blunt at ends, terminal and numerous on the ends of the small branchlets, remaining on the trees, after the seed is shed, for years; scales numerous, thin, flat, greyish-brown. *h.* 40ft. Japan. This tree is found at great elevations, becoming, at 9000ft., a mere shrub, 2ft. high. SYN. *L. japonica.* (S. Z. F. J. 105, under name of *Abies leptolepis.*)

L. Lyallii (Lyall's). *l.* on branchlets in bundles of forty or fifty, crowded, spreading, curved, narrow-linear, blunt-pointed, rather [illegible] long, about a quarter of a line broad; those on young shoots single, and much longer. Branches nearly horizontal; young shoots and buds clothed with cobwebby wool. *cones*, young ones solitary, sessile, 2in. long, 1in. broad; full-sized cones unknown. *h.* 36ft. to 45ft. Rocky Mountains, &c., at great altitudes. A remarkable pyramidal tree.

L. occidentalis (Western).* *l.* on branchlets in bundles of fourteen to twenty, erectly spreading, stiff, narrow-linear, attenuated at base, somewhat obtuse at apex, pale green, ½in. to ¾in. long, three-quarters of a line wide. Branches short; lower ones horizontal or slightly declining; upper ones ascending. *cones* small, solitary, erect, ovate-globose, ¾in. to 1in. long, ¾in. broad; scales orbicular, loosely imbricated. *h.* sometimes 150ft. North-west America (at heights of 6000ft.). A splendid pyramidal tree. SYNS. *L. americana brevifolia, Pinus Nuttallii.*

L. pyramidalis (pyramidal). A synonym of *L. europæa.*

L. vulgaris (common). A synonym of *L. europæa.*

LARKSPUR. *See* **Delphinium.**

LARREA (named after John Anthony de Larrea, a Spanish promoter of science). ORD. *Zygophylleæ.* A very small genus (four species have been described) of greenhouse evergreen shrubs. Flowers yellow; the peduncles inter-stipular, short, terminal, one-flowered. Leaves pinnate, two-lobed or two-parted. For culture, &c., *see* **Zygophyllum.**

Larrea—*continued.*

L. mexicana (Mexican). *fl.* bright yellow. Summer. *l.* sessile, two-foliolate. *h.* 4ft. to 10ft. This species is the Creosote-plant of North-west America; it emits an odour so repulsive that no animal will touch it. The twigs are covered with a resinous substance, of which, it is reported, the Indians make a glue, with which they fasten the heads of arrows to the shaft. It is also used as a remedy for rheumatism.

L. nitida (shining). *fl.* yellow. June and July. *l.* impari-pinnate, smooth, clammy, with five or seven pairs of approximate linear leaflets. *h.* 8ft. Buenos Ayres, 1823.

LASIANDRA. A synonym of **Pleroma** (which *see*).

LASIONEMA. A synonym of **Macrocnemum** (which *see*).

LASIOPETALUM (from *lasios*, woolly, and *petalon*, a petal; in reference to the under surface of the petals and leaves being clothed with a rusty indumentum). Including *Corethrostylis.* ORD. *Sterculiaceæ.* A genus comprising about twenty-five species of greenhouse evergreen shrubs, natives of extra-tropical Australia. Racemes few-flowered, rarely cymose-ramose, opposite the leaves or axillary. Leaves alternate, pseudo-verticillate, or rarely almost opposite, entire, dentate, sinuate, or rarely lobed. Lasiopetalums delight in a well-drained compost of sandy peat and fibry loam. Propagated by cuttings, made of half-ripened wood, and inserted in sand, during April or May, under a glass.

L. Baueri (Bauer's). *fl.* white, few, in short, pedunculate, reflexed racemes, rarely branching into cymes. Spring. *l.* on short petioles, linear or oblong-linear, obtuse, mostly 1in. to 2in. long; the margins revolute, coriaceous, glabrous or minutely tomentose above, white or rusty-tomentose beneath. Branches hoary. 1868.

L. bracteatum (bracteate). This is the correct name of the plant described in this work as *Corethrostylis bracteata.*

L. ferrugineum (rusty). *fl.* dark purple, small. June. *l.* shortly-stalked, narrow-lanceolate or oblong-linear. Young branches hoary or rusty with a short tomentum. 1791. A tall shrub. (B. M. 1766.)

L. macrophyllum (large-leaved). *fl.* pale green; calycine segments glabrous inside; bracts three, lanceolate-elliptic. May. *l.* ovate-lanceolate or lanceolate, three-nerved. *h.* 5ft. 1835. (B. M. 3908.)

LASIOSPERMUM (from *lasios*, woolly, and *sperma*, a seed; in reference to the woolly texture of the achenes). SYNS. *Lanipila, Mataxa.* ORD. *Compositæ.* This genus comprises four species of perennial, or rarely annual, glabrous herbs, natives of the Cape of Good Hope. Flower-heads small, heterogamous, rayed or disk-formed; ray-florets white or violet; disk-florets yellow. Leaves alternate, pinnatisect. *L. pedunculare*, the only species yet introduced, is a greenhouse or half-hardy plant, thriving in any ordinary garden soil. Propagated by divisions, in spring; or by cuttings, placed under a handlight, in summer.

L. pedunculare (peduncled). *fl.-heads* discoid, marginal flowers minute, tubular. *l.* membranous. *h.* 6in.

LASTHENIA (so called in honour of a Greek girl of that name, who attended the lectures of Plato in man's attire). SYN. *Rancagua.* Including *Hologymne.* ORD. *Compositæ.* This genus comprises about three species of half-hardy, annual, glabrous herbs, two of which are natives of California, and the third of Chili. Flower-heads yellow, on long peduncles, often nodding; involucre oblong or campanulate. Leaves opposite, linear, entire. Only two species are in cultivation, and both are very showy, hardy plants. They grow in any moderately good garden soil, but thrive best in warm, sheltered spots. Seeds should be sown either in September or October, and protected during winter; or in the latter part of April for a summer display.

L. californica (Californian). A synonym of *L. glabrata.*

L. glaberrima (smoothest). *fl.-heads* yellow; involucre about fifteen-toothed; pappus of five to ten firm, chaffy scales. May. *l.* linear, entire, rather succulent. *h.* 1ft. California, 1834.

L. glabrata (smooth).* *fl.-heads* bright yellow, about 1in. across; involucre fifteen-toothed; pappus wanting; achenes mucronate at apex. May to July. *l.* sometimes one-toothed or lobed on each side. Stems branched from the base, glabrous or slightly pubescent. *h.* 9in. to 18in. California, 1834. SYNS. *L. californica, Hologymne glabrata.* (B. M. 3730; B. R. 1780, 1823.)

LASTREA. *See* **Nephrodium.**

LATANIA (its native name at Mauritius is *Latanier*). Bourbon Palm. ORD. *Palmeæ*. A small genus (three species have been described) of very handsome stove palms, natives of the Islands of the Mauritius. Flower-spikes branching, sheathed in incomplete spathes, producing males and females on different plants. Stems marked with circular scars, and bearing at the summit a tuft of fan-shaped leaves. The species thrive in a compost of two parts of rich loam and one of peat, to which may be added a small quantity of sand. The drainage must be at all times perfect. Propagated by sowing seeds in a compost similar to that mentioned above, and placing in a moist, gentle heat.

L. aurea (golden). A synonym of *L. Verschaffeltii*.

L. borbonica (Bourbon). *See* **Livistona chinensis.**

L. Commersonii (Commerson's).* *l.* cuneate-flabellate, very deeply incised, gracefully recurved; segments margined with a reddish-chocolate-coloured band, and edged with fine teeth-like spines; petioles long and smooth, of a deep chocolate-red. Stem smooth and slender. *h.* 7ft. Mauritius and Bourbon, 1778. A very handsome and distinct species. SYN. *L. rubra*.

L. glaucophylla (glaucous-leaved). A synonym of *L. Loddigesii*.

L. Loddigesii (Loddiges').* *l.* bright green, with a glaucous hue, palmate, plaited, from 2ft. to 4ft. from point of attachment to the margin, split down about one-third their length into broad segments; petioles from 2ft. to 8ft. in length, stout, spreading, very glaucous-green, slightly tinged with red in young plants. *h.* 10ft. Round Island, 1823. A very large and handsome species. SYN. *L. glaucophylla*.

L. rubra (red). A synonym of *L. Commersonii*.

L. Verschaffeltii (Verschaffelt's).* *l.* flabelliform and roundish, very deeply incised, erect, but somewhat spreading, deep glaucous-green; ribs of a golden colour; petiole smooth, of an orange tint, from 2ft. to 4ft. long. Stem stout. *h.* 7ft. Rodriguez Island. SYN. *L. aurea*. (I. H. 1859, 229.)

LATERAL. Fixed near or upon the side of anything.

LATERALS. The side-shoots that emanate right and left of the leading branch or shoot.

LATHRÆA (from *lathraios*, hidden; on account of the species being found as if hidden under trees and shrubs). ORD. *Orobanchaceæ*. A small genus (three species) of half-hardy, leafless, herbaceous plants, one being found mostly in Western Europe, another broadly dispersed over Europe and Asia, and the third a native of Japan. Flowers white, yellowish, bluish, or tinged with pink, short or long-stalked, ebracteolate; racemes densely spike-formed or loose and few-flowered. Scales on the branchlets sterile, shortly imbricated; those on the scapes erect and scattered. For culture, *see* **Orobanche.**

L. squamaria (scaly).* Toothwort. *fl.* flesh-coloured or slightly bluish, streaked with purple or dark red, numerous and nodding, in a dense spike, or sometimes shortly stalked; corolla half as long again as the calyx. Early spring. Flowering stems erect, 3in. to 12in. high, with a few fleshy scales. Rootstock fleshy, creeping, covered with close-set thick scales. Asia and Europe (Britain), on roots of trees. Plant pale rose-colour.

LATHYRUS (*Lathuros* was the old Greek name for the Pea, used by Theophrastus). Including *Platystylis*. *Orobus*, too, is included, by Bentham and Hooker, under *Lathyrus*; but, as the species are so well known in gardens as *Orobus*, it is kept distinct in this work. ORD. *Leguminosæ*. A genus comprising, according to some authorities, 170 species (which are, however, reduced to 100 by Bentham and Hooker) of, for the most part, hardy climbing herbs, dispersed over various parts of the globe, chiefly in temperate climates or in mountain ranges within the tropics. Flowers blue, violet, rose, white, or yellow, often showy, on axillary, elongated peduncles, solitary or racemose. Leaves pinnate, with one to three pairs of leaflets. As a rule, the species are exceedingly ornamental and very desirable plants. They are of easy culture, thriving in almost any moderately good garden soil. Propagated

Lathyrus—*continued.*

by divisions, made early in spring, in the case of perennial species; or by seeds, sown at the same season, in an open border.

L. amphicarpos (double-fruited). Earth Pea. *fl.* pink, tinged with blue; peduncles one-flowered, longer than the leaves. Summer. *l.* with one pair of lanceolate leaflets; tendrils simple; stipules semi-sagittate. Stems winged, diffuse. *h.* 6in. to 12in. Syria, 1680. A very singular hardy annual, having underground stems, which are whitish, and bear flowers and legumes absolutely perfect, and resembling those on the stems above ground, except that the flowers are smaller, and do not expand. (S. B. F. G. 236.)

L. Armitageanus (Armitage's). A synonym of *L. magellanicus*.

L. cirrhosus (tendrilled). *fl.* rosy-pink; peduncles many-flowered, longer than the leaves. Summer. *l.* with two or three pairs of alternate, elliptic, mucronulate leaflets; stipules semi-sagittate, linear, acute. Stems tetragonal, winged. Pyrenees, &c., 1870. Annual climber. (R. G. 628.)

L. cyaneus (blue). *fl.* blue, pink; peduncles few-flowered, longer than the leaves. May and June. *l.*, leaflets two or three pairs, approximate, linear-lanceolate, acute; stipules equal in length to petiole. *h.* 1ft. Caucasus, 1823. SYN. *Platystilis cyaneus*. (S. B. F. G. 239.)

L. grandiflorus (large-flowered).* *fl.* rose-coloured, very large, with an emarginate vexillum; peduncles two or three-flowered, longer than the leaves. June to August. *l.* with one pair of large, ovate, obtuse, waved leaflets; stipules small, semi-sagittate. Stems tetragonal, winged. South Europe, 1814. Annual climber. (B. M. 1938.)

L. heterophyllus (variable-leaved). *fl.* large, with the standard wings flesh-coloured, and the keel whitish; peduncles six to eight-flowered. July to September. *l.* with one or two pairs of lanceolate, mucronulate leaflets; petioles winged at the base; tendrils branched. Stem erect, rigid, winged. Europe, 1731. Perennial climber.

L. magellanicus (Magellan).* Lord Anson's Pea. *fl.* bluish-purple; peduncles long, many-flowered. June to September. *l.* with one pair of ovate or ovate-oblong leaflets; stipules broad, cordately-sagittate, broader than the leaves; tendrils trifid. Straits of Magellan, 1744. A strong-growing, handsome perennial. SYN. *L. Armitageanus*. (S. B. F. G. ser. ii. 344.)

L. latifolius (broad-leaved). A synonym of *L. sylvestris platyphyllus*.

FIG. 376. PORTION OF FLOWERING STEM OF LATHYRUS ODORATUS.

Lathyrus—*continued.*

L. maritimus californicus (sea-loving, Californian). *fl.* purple, elegantly veined, large; peduncles many-flowered, about equal in length to the leaves. July to September. *l.* glaucous, with four or five pairs of ovate-oblong, glabrous, mucronulate leaflets; tendrils three-parted; stipules semi-sagittate. Stems tetragonal, glabrous. North California, 1826. Perennial climber. (B. R. 1144, under name of *L. californicus.*)

L. Nissolia (Nissolia). *fl.* of a beautiful crimson, variegated with purple and white, solitary, on long peduncles; peduncles articulated at the apex, and downy on the upper part, where they bear two little awl-shaped bracts. May and June. *l.*, petioles dilated, foliaceous, grass-like; stipules small, subulate, usually wanting. Stem erect. *h.* 6in. to 12in. Europe, &c. (Britain). Hardy annual. (Sy. En. B. 398.)

L. odoratus (sweet-scented).* Sweet Pea. *fl.* of various colours, fragrant; peduncles two or three-flowered, much longer than the leaves. Summer. *l.*, leaflets ovate, mucronulate; stipules semi-sagittate, lanceolate. Stems winged. Sicily, &c., 1700. Hardy annual climber. The Sweet Pea is so generally known, and so deservedly popular, that it needs no eulogy here. See Fig. 376. (B. M. 60.) The varieties are numerous, and include the following: BUTTERFLY; FAIRY QUEEN; SCARLET, BLACK, and STRIPED INVINCIBLE; PAINTED LADY; PRINCESS OF PRUSSIA; and VIOLET QUEEN.

L. palustris (marsh). *fl.* variegated with blue and purple; peduncles three to five-flowered, hardly longer than the leaves. Summer. *l.* with two or three pairs of oblong, mucronulate leaflets; petioles subulate; tendrils bifid or trifid; stipules semi-sagittate, small. Stems winged, rather erect. Northern hemisphere (Britain). Perennial climber. A distinct and pretty bog plant. (Sy. En. B. 404.)

L. pratensis (meadow). *fl.* yellow; peduncles many-flowered, twice the length of the leaves. Summer. *l.* with one pair of oblong-linear or lanceolate leaflets; tendrils usually simple; stipules sagittate-ovate. Europe (Britain). Hardy perennial climber. (Sy. En. B. 400.)

L. roseus (rose-coloured).* *fl.* beautiful rose-coloured; peduncles filiform, longer than the leaves. Summer. *l.* with one pair of ovate-roundish leaflets; tendrils very short; stipules small, subulate. Stem slender, not winged. Iberia, 1822. Hardy herbaceous climber.

L. rotundifolius (round-leaved).* *fl.* rose-coloured; peduncles many-flowered, longer than the leaves. May to July. *l.* with one pair of ovate-roundish leaflets; stipules semi-sagittate, or little toothed. Stems winged, branched. Tauria, 1822. Hardy perennial climber. (B. M. 6522.)

L. sativus (cultivated). Chickling Vetch. *fl.* white; peduncles one-flowered, longer than the petioles, bracteolate and articulated at the apex. June and July. *l.*, leaflets linear-oblong; tendrils trifid; stipules semi-sagittate, ovate, ciliated. Stems winged. South Europe, 1640. Hardy climbing annual. (B. M. 115.)

FIG. 377. PORTION OF FLOWERING STEM OF LATHYRUS SYLVESTRIS.

L. sylvestris (wood). *fl.* red, variegated with pale crimson, violet, and tints of green; wings violet; peduncles three to eight-flowered, length of leaves. July to September. *l.* with one pair of lanceolate, attenuated, coriaceous leaflets; stipules very narrow. Stems winged. Europe, &c. (Britain). Perennial climber. See Fig. 377. (Sy. En. B. 402.)

L. s. platyphyllus (broad-leaved).* Everlasting Pea. *fl.* rose-coloured, large; peduncles many-flowered, longer than the leaves. August. *l.* with one pair of elliptic, mucronate leaflets; stipules broad, ovate. Stems winged. Europe, &c. A well-known and very desirable hardy climbing perennial. SYN. *L. latifolius.* (Sy. En. B. 403.) There is a very good white-flowered form of this plant. Both the type and the white variety can be grown with good effect amongst other climbers, over trellises, and in such-like places.

L. tingitanus (Tangiers). *fl.* with a large purple vexillum, and with the wings and keel bright red; peduncles two-flowered, longer than the leaves. June and July. *l.*, leaflets ovate, obtuse, mucronulate; stipules ovate, semi-sagittate. Stem winged. Africa (Tangiers), 1680. Hardy annual. (B. M. 100.)

L. tuberosus (tuberous). *fl.* rose-coloured, large; peduncles three to six-flowered, two or three times the length of the leaves. June and July. *l.* with one pair of oblong-elliptic, rather mucronulate leaflets; stipules semi-sagittate, narrow, acute. Stems tetragonal. Europe, West Asia, North Africa, 1596 (naturalised in Essex). Perennial climber. (B. M. 111; Sy. En. B. 401.)

LATUA (from *Latué*, the native name). SYN. *Lycioplesium.* ORD. *Solanaceæ.* A monotypic genus, the species being a very showy half-hardy, often spiny, shrub. For culture, *see* **Cantua.**

L. venenosa (poisonous). *fl.* rich violet; corolla 1in. long, ½in. broad; tube campanulate; calyx five-fid. February. *l.* elliptic, acute, entire, on short, rather broad petioles, shining, with pubescent or spiny margins. *h.* 4ft. Chili. (B. M. 5373, under name of *Lycioplesium pubiflorum.*)

LAUGERIA. Now included under **Guettarda** (which *see*).

LAUREL. *See* **Laurus.**

LAUREL, CHERRY. A common name of **Cerasus Laurocerasus** (which *see*).

LAURELIA (from *Laurus*, the Bay-tree; in allusion to the similarly-scented aromatic leaves). SYN. *Pavonia.* ORD. *Monimiaceæ.* A small genus (only a couple of species) of tall greenhouse trees, exhaling a powerful aromatic odour when bruised; one is a native of Chili, and the other of New Zealand. Flowers polygamo-monœcious or diœcious, in axillary cymes or racemes, which are shorter than the leaves. Leaves opposite, coriaceous, entire or serrate-toothed. The under-mentioned species is included, by some authors, under **Atherosperma** (which *see* for culture).

L. novæ-zelandiæ (New Zealand). *fl.* in axillary racemes, silky, ½in. in diameter. *l.* petiolate, 1½in. to 2½in. long, ovate or oblong, obtuse, obscurely serrate. Branches whorled. Trunk (in its native country) 150ft. high, 3ft. to 7ft. in diameter, with buttresses 15ft. thick at the base. New Zealand. This tree affords a soft yellowish timber, which is much used by the colonists for boatbuilding.

LAURENTIA (named after M. A. Laurenti, an Italian botanist of the seventeenth century). SYN. *Solenopsis.* ORD. *Campanulaceæ.* A genus comprising about ten species of delicate or small greenhouse herbaceous plants, inhabiting the Mediterranean region, South Africa, and North-west America. Flowers bluish, small. Plant sometimes creeping, with filiform branches, or else erect or ascendent, with narrow alternate leaves, and axillary one-flowered or terminal racemose peduncles; sometimes almost stemless, with radical, rosulate leaves, and one-flowered scapes. Several of the species are often erroneously classed under **Lobelia** (which *see* for culture of those described below).

L. erinoides (Erinus-like). *fl.* from the axils of the upper leaves corolla purplish-white, marked with deep purple and two yellow spots, with a campanulate tube and a five-lobed limb. July and August. *l.* glabrous, mostly petiolate; those from the root, and lower stem ones, spathulate; upper ones linear, entire. Cape of Good Hope, 1759. Plant stemless. (B. M. 3609, under name of *Lobelia erinoides.*)

L. minuta (minute). *fl.* pale purplish; scapes ebracteate, erect. June to September. *l.* all radical, ovate. Cape of Good Hope. Plant tufted, stemless. (B. M. 2590, under name of *Lobelia minuta.*)

LAURINEÆ. A natural order of aromatic, sometimes fœtid, trees or shrubs (except *Cassytha*, which is

Laurineæ—*continued.*

a twining herb), natives, for the most part, of tropical regions. Flowers greenish or yellow, small, sometimes minute, often cymose, umbellate, or capitate. Leaves alternate or scattered, rarely opposite, coriaceous and evergreen, rarely membranaceous and annual, often (except *Hernandia*) glandular-dotted, feather-veined, or more or less distinctly three to five-nerved, between the veins often thickly reticulate, undivided or rarely two or three-lobed, the rest entire. *Laurineæ* secrete a pungent volatile oil in the bark and glands of the leaves and flowers. *Laurus nobilis*, a South European tree, is the Victor's Laurel or Sweet Bay, the leaves of which have a pleasant scent and an acrid and aromatic taste; they are used as a flavouring. *Cinnamomum officinale* yields the Cinnamon-bark of commerce. *Camphora officinarum*, a native of China, Japan, and Cochin China, furnishes Camphor, a concrete, volatile, colourless oil, with a penetrating odour, and an acrid but cooling taste. The woods of many of the *Laurineæ* are particularly useful to cabinet-makers and turners, being of a fine and solid tissue. There are about thirty-four genera and 900 species. Well-known examples are: *Camphora, Cinnamomum, Laurus, Persea*, and *Sassafras*.

LAUROCERASUS. Included under *Cerasus*.

LAURUS (the old Latin name of the European species). Laurel. ORD. *Laurineæ*. This much-confused genus comprises but a couple of species of hardy evergreen trees, one of which is from the Mediterranean region, and the other a native of the Canary Islands. Flowers shortly pedunculate, fasciculate or shortly racemose. Berry ovoid. Leaves alternate, feather-veined. The Laurel was called *Daphne* by the Greeks, and was consecrated to priests and heroes, and used in sacrifices. The Bay will succeed in almost any soil. Cuttings inserted under a hand glass, in sandy soil, root readily, if attended to for shade and moisture. Seeds, also, are often produced where plants of the two sexes occur.

L. Benzoin.* *See* **Lindera Benzoin.**

FIG. 378. FRUITING TWIG, INFLORESCENCE, AND FRUITS OF LAURUS NOBILIS.

L. nobilis (noble).* Common Laurel; Sweet Bay-tree. *fl.* yellowish, inconspicuous. Early spring. *fr.*, berries very dark-purple, ripe in October. *l.* oblong-lanceolate, acute, veiny. *h.* 30ft. to 60ft. South Europe, 1562. A well-known, aromatic, evergreen tree or shrub. See Fig. 378. There are two or three unimportant varieties in cultivation, having variegated, curled, and Willow-shaped leaves.

L. Sassafras. *See* **Sassafras officinale.**

LAURUSTINUS. *See* **Viburnum Tinus.**

LAVANDULA (from *lavo*, to wash; in reference to its use in the preparation of Lavender-water). Lavender. SYN. *Fabricia*. ORD. *Labiatæ*. A genus comprising about a score species of greenhouse or hardy perennial herbs, shrubs, or sub-shrubs, inhabiting the Mediterranean regions, and extending from the Canary Islands to the East Indian Peninsula. Flowers blue or violet, sub-sessile; corolla tube exserted, a little dilated at the throat; limb oblique, bilabiate; whorls two to ten-flowered, in cylindrical simple spikes. Nutlets glabrous, smooth. Leaves often clustered near the base, sometimes pinnatifid-dissected. The species are of easy culture in almost any friable garden soil. Propagation may be readily effected by cuttings of young wood, inserted in free sandy soil, under handlights, in autumn, and planted out during the following spring. The flower spikes of the common Lavender (*L. vera*) are frequently cut and dried, on account of their peculiar lasting fragrance. Cutting, however, should not take place until the flowers are fully expanded. The spikes should be spread and dried slowly, in a cool, shady position, and be then hung up or stored in a dry place. Although the Lavender is possessed of medicinal qualities, which were, at one time, somewhat extensively employed, it is now almost solely grown for the essential oil, which is largely used in perfumery.

L. abrotanoides (Abrotanum-like). *fl.* in dense spikes; corolla bright purple, the upper lip deeply emarginate, the lower with three equal, rounded, entire lobes. *l.* densely crowded, sub-sessile, ovate, deeply bipinnatifid. Canary Islands. A pretty species. (Ref. B. 159.)

L. dentata (toothed). *fl.* dark purple; whorls six to ten-flowered; spikes loose, rather tufted at the apex; calyx oblong, pubescent, about equal in length to the tube of the corolla. Summer. *l.* oblong, linear, or lanceolate, bluntly and pinnately toothed, pubescent, hoary beneath, with revolute edges. Branches ascending, tetragonal, pubescent. *h.* 1ft. to 2ft. South-west Europe, 1597. A pretty shrub, hardy only in warm, sunny situations. (B. M. 400.)

L. pinnata (pinnate-leaved). *fl.* purple, large, in imbricated branched spikes. June. *l.* petiolate; leaflets wedge-shaped. *h.* 1½ft. Madeira, 1777. Greenhouse. (B. M. 401.)

L. Spica (Spica). A synonym of *L. vera*.

L. Stœchas (Stœchas). *fl.* dark purple; whorls six to ten-flowered; spikes dense, comose; calyces ovate, hoary, shorter than the corolla. Summer. *l.* oblong-linear, quite entire, with revolute edges, clothed with hoary tomentum on both surfaces. *h.* 2ft. to 3ft. Mediterranean region, 1568. A handsome, hardy shrub, having a strong, aromatic, agreeable flavour. (S. F. G. 549.)

L. vera (true).* Common Lavender. *fl.* blue, rarely white; whorls six to ten-flowered; spikes somewhat interrupted. Summer. *l.* oblong-lanceolate, somewhat spathulate, quite entire, narrowed a long way at the base, with somewhat revolute margins, hoary on both surfaces. *h.* 1ft. to 2ft. South Europe, 1568. SYN. *L. Spica*. (B. M. Pl. 199.)

LAVATERA (named in honour of two brothers Lavater, physicians of Zurich, and naturalists, who lived in the eighteenth century). ORD. *Malvaceæ*. A genus containing about eighteen species of Old World hardy or half-hardy annuals, biennials, perennials, or shrubby plants, allied to *Malva*, but having the three to six lobes of the involucel coherent about half-way up. Flowers axillary and solitary, clustered, or terminal and racemose. Leaves angled or lobed. The following are the only species worth growing. For culture, *see* **Malva.**

L. arborea (tree-like). Tree Mallow. *fl.* pale purple, 2in. across; pedicels aggregate, axillary, one-flowered. Summer and autumn. *l.* large, on long petioles, five to nine-lobed, crenate. Stem arboreous. *h.* 6ft. to 10ft. Coasts of Europe (Britain). A handsome biennial species, softly pubescent all over. (Sy. En. B. 279.) There is a showy garden form of this (*variegata*) with variegated leaves. See Fig. 379, for which we are indebted to Mr. Wm. Bull.

L. Olbia (Olbia). Tree Lavatera. *fl.* reddish-purple, solitary, on short pedicels. June to October. *l.* soft, woolly, five-lobed; upper ones three-lobed, with the middle lobe elongated; uppermost leaves oblong, almost undivided. Stem shrubby, scabrous. *h.* 6ft. Provence, 1570 (now become naturalised in some parts of Britain).

L. trimestris (three-monthly).* *fl.* rose-coloured; pedicels solitary. Summer. *l.* smoothish, roundish-cordate; upper ones lobed. Stem herbaceous, scabrous. *h.* 3ft. to 6ft. South Europe, Asia Minor, &c., 1633. A common but very beautiful and showy hardy annual. See Fig. 380. (B. M. 109.)

Lavatera—*continued.*

L. unguiculata (claw-petaled). *fl.* lilac, solitary, axillary, on short pedicels, about 3in. across. Summer. *l.* tomentose on both surfaces, acutely five-lobed; upper ones three-lobed. Stem shrubby, tomentose from starry down. *h.* 6ft. South-east Europe, 1807.

Lavradia—*continued.*

dozen species) of very glabrous stove sub-shrubs, all natives of Brazil. Flowers disposed in terminal paniculate racemes, rarely axillary. Leaves alternate, closely packed, rigid, entire or sub-serrate. The undermentioned species

FIG. 379. LAVATERA ARBOREA VARIEGATA.

LAVENDER. *See* **Lavandula.**

LAVENDER, COTTON. *See* **Santolina.**

LAVRADIA (named after the Marquis of Lavradio, a distinguished patron of botany, and once Viceroy of Brazil). ORD. *Violarieæ.* A small genus (about half-a-dozen species) of very glabrous stove sub-shrubs, all natives of Brazil. Flowers disposed in terminal paniculate racemes, rarely axillary. Leaves alternate, closely packed, rigid, entire or sub-serrate. The undermentioned species thrives in a well-drained compost of sandy peat and fibry loam. Propagated by cuttings of ripened shoots, placed in sand, under a bell glass, in heat.

L. montana (mountain). *fl.* deep rose, in crowded racemose panicles. *l.* alternate, almost sessile, obovate, marginate, denticulated, obtuse, ending in a mucrone. *h.* 2ft. to 3ft. 1826.